State of Washington
DEPARTMENT OF FISH AND WILDLIFE
Mailing Address: 600 Capitol Way N Olympia, WA 98501-1091 (360) 902-2222, TDD (360) 902-2207
Main Office Location: Natural Resources Building 1111 Washington Street SE Olympia, WA

May 29, 2008

Kelly McLain
Aquatic Pesticide Program
Department of Ecology
P.O. Box 47600
Olympia, Washington 98504-7600

NPDES Permit WA0041009
Annual Report

Dear Ms. McLain:

Enclosed are Washington Department of Fish and Wildlife's Post-Treatment Discharge Monitoring Reports for Chopaka Lake and Blue Lake – Lime Belt (Okanogan County); Corral, Blythe, Chukar and Scaup lakes (Grant County); and the Sprague Lake project on the Negro and Cow Creek drainage (Adams and Lincoln Counties), treated with rotenone in the fall of 2007. All other pertinent documentation as mandated by the reporting requirement under S3.A of NPDES Waste Discharge Individual Permit Number WA0041009 is included.

Also enclosed is a copy of the amended FSEIS for the lakes proposed for treatment in the fall of 2007, including all SEPA comments, results and decisions, as well as the 2008-2009 Lake and Stream Rehabilitation Proposal list.

Please feel free to contact me at 360-902-2711 or email anderjda@dfw.wa.gov with any questions.

Sincerely,

Jon. Anderson
Resident Native Fisheries Manager

Enclosures

cc: Jim Uehara, WDFW Olympia

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

POST-TREATMENT DISCHARGE MONITORING REPORTS

OKANOGAN COUNTY

CHOPAKA LAKE
BLUE LAKE (LIME BELT)

GRANT COUNTY

CORRAL LAKE
BLYTHE LAKE
CHUKAR AND SCAUP LAKES

ADAMS AND LINCOLN COUNTIES

SPRAGUE LAKE
NEGRO CREEK
DIXON'S POND
COW CREEK
HALLIN LAKE
COW LAKE
FINNELL LAKE

12. **Concentration of rotenone in formulated Rotenone product:** 6.7% in powder and 5.0% in liquid

13. **Concentration of active rotenone in water (ppm):** 1.0 ppm

14. **Water conditions/quality:** Water sampling done within 24hrs pre-treatment:

Depth (m)	Temperature ©	pH	DO
0.3	6.20	9.19	12.91
1.2	5.86	9.20	13.28
2.1	5.78	9.22	13.37
3.1	5.80	9.23	13.48

15. **Detoxification of rotenone treated water (if required): Description of detoxification methods/equipment; potassium permanganate application rate (pounds per hour); flow rate of stream/outlet (cu. ft. per sec.); estimate of average concentration (ppm):** N/A

16. **Description of lake inlets(s)/outlet(s) and any temporary water control measures (if required):** N/A

17. **Period of Toxicity (duration of water quality reduction):** 4-6weeks

18. **Eradicated fish species:** smallmouth bass and rainbow trout

19. **Results of pre and post treatment monitoring:** Prior to the treatment, the lake was sampled for various parameters including temperature, pH, and zooplankton. Post sampling included VOC and Semi-VOC both within 24 hours of treatment and 4 weeks post-treatment.

20. **Impact on non-target organisms:** None observed

21. **Brief description of treatment/detoxification and other comments:** The treatment began at 0900 on Sept 25, 2007 and was completed the same day based on a concentration of 1 ppm. The weather was mild with an afternoon wind helping to mix the rotenone throughout the lake. Hundreds of dead juvenile (3-5 inches) smallmouth bass were noted along the shoreline on Sept 26th in addition to several hundred smallmouth in the 6-14 inch range. There were very few trout mortalities, mostly in the 18-20 inch class in numbers less than fifty. On the second day following the treatment, there were no fish observed swimming at any part of the lake, which indicated good efficacy. A bioassay with 5 rainbow trout was conducted at 6 weeks and all fish survived, indicating that the lake had detoxified. During Apr-May of 2008, 4,000 catchable 10-12 inch rainbow and 500 larger (14-15 inch) rainbow trout were planted in the lake.

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71002.4
Client: Washington Department of Fish & Wildlife
Client Job Name: Chopaka Lake Rehab
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	South End of Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
	Reporting						
Date analyzed	Limits	10/02/07	10/02/07	10/02/07	10/02/07	10/02/07	
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
Acetone	10.0	nd		nd			
1,1-Dichloroethene	1.0	nd	76%	nd	87%	94%	8%
Methylene chloride	10.0	nd		nd			
Methyl-t-butyl ether (MTBE)	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
n-Hexane	1.0	nd		nd			
2-Butanone (MEK)	10.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	107%	nd	111%	106%	5%
Trichloroethene (TCE)	1.0	nd	105%	nd	110%	105%	5%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	101%	nd	104%	99%	5%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
2-Hexanone	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene (PCE)	1.0	nd		nd			
1,2-Dibromoethane (EDB)	0.10	nd		nd			
Chlorobenzene	1.0	nd	103%	nd	104%	101%	3%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	1.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd*		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		3.8			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

*-instrument detection limits

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71002.4
Client: Washington Department of Fish & Wildlife
Client Job Name: Chopaka Lake Rehab
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	South End of Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
	Reporting						
Date analyzed	Limits	10/02/07	10/02/07	10/02/07	10/02/07	10/02/07	
Surrogate recoveries:							
Dibromofluoromethane		100%	99%	99%	98%	99%	
Toluene-d8		96%	98%	97%	97%	97%	
4-Bromofluorobenzene		103%	101%	103%	99%	101%	

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
J - estimated quantitation, below listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

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ESN Job Number: S71002.4
Client: Washington Department of Fish & Wildlife
Client Job Name: Chopaka Lake Rehab
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	South End of Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/01/07	10/01/07	10/02/07	10/01/07	10/01/07	
Date analyzed	Limits	10/01/07	10/01/07	10/02/07	10/01/07	10/01/07	
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	55%	56%	2%
2-Chlorophenol	2.0	nd		nd	72%	73%	1%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	118%	nd	111%	108%	3%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexacholorethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	84%	85%	1%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd	77%	74%	4%
2,4-Dimethylphenol	2.0	nd		nd			
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	114%	114%	0%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	114%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd			
2-Methylnapthalene	2.0	nd		6.0			
1-Methylnapthalene	2.0	nd		3.0			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinotrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	95%	nd	84%	86%	2%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd			
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd		nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd	117%	116%	1%
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	118%	nd			
Pyrene	0.2	nd		nd	102%	106%	4%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd		nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	110%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

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Analytical Results

8270, µg/L		MTH BLK	LCS	South End of Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/01/07	10/01/07	10/02/07	10/01/07	10/01/07	
Date analyzed	Limits	10/01/07	10/01/07	10/02/07	10/01/07	10/01/07	

Surrogate recoveries					
2-Fluorophenol	88%			66%	66%
Phenol-d6	89%			73%	72%
Nitrobenzene-d5	87%	50%	52%	78%	72%
2-Fluorobiphenyl	114%	70%	117%	123%	118%
2,4,6-Tribromophenol	109%			119%	116%
4-Terphenyl-d14	124%	90%	108%	124%	126%

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
Acceptable Recovery limits:
2-Flurophenol: 10-135 %
Phenol - d5: 10-135 %
2,4,6- tribromophenol: 29-159%
Nitrobenzene - d5: 20-120 %
2-Flurobiphenyl: 50-150%
p-Terphenyl-d14: 50-150%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71109.3
Client: Washington Department of Fish and Wildlife
Client Job Name: Chopaka Lake
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	Chopaka Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			11/07/07			
Date analyzed	Limits	11/13/07	11/13/07	11/13/07	11/13/07	11/13/07	
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
Acetone	10.0	nd		nd			
1,1-Dichloroethene	1.0	nd	90%	nd	96%	94%	2%
Methylene chloride	10.0	nd		nd			
Methyl-t-butyl ether (MTBE)	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
n-Hexane	1.0	nd		nd			
2-Butanone (MEK)	10.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	102%	nd	106%	101%	5%
Trichloroethene (TCE)	1.0	nd	104%	nd	106%	104%	2%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	105%	nd	112%	110%	2%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
2-Hexanone	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene (PCE)	1.0	nd		nd			
1,2-Dibromoethane (EDB)	0.10	nd		nd			
Chlorobenzene	1.0	nd	114%	nd	120%	119%	1%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	1.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

*-instrument detection limits

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71109.3
Client: Washington Department of Fish and Wildlife
Client Job Name: Chopaka Lake
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	Chopaka Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			11/07/07			
Date analyzed	Limits	11/13/07	11/13/07	11/13/07	11/13/07	11/13/07	
Surrogate recoveries:							
Dibromofluoromethane		127%	124%	128%	127%	128%	
Toluene-d8		104%	105%	105%	104%	105%	
4-Bromofluorobenzene		101%	101%	103%	99%	101%	

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
J - estimated quantitation, below listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

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Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71109.3
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Analytical Results

8270, µg/L		MTH BLK	LCS	Chopaka Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	11/19/07	11/19/07	11/14/07	11/19/07	11/19/07	
Date analyzed	Limits	11/19/07	11/19/07	11/19/07	11/19/07	11/19/07	
Sample collected				11/07/07			
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	102%	100%	2%
2-Chlorophenol	2.0	nd		nd	115%	119%	3%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	120%	nd	105%	107%	2%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexacholorethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	113%	115%	2%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd	75%	79%	5%
2,4-Dimethylphenol	2.0	nd		nd			
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd			
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	120%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	79%	81%	3%
2-Methylnapthalene	2.0	nd		nd			
1-Methylnapthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinotrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	100%	nd	88%	91%	3%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd			
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd		nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd	102%	103%	2%
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	122%	nd			
Pyrene	0.2	nd		nd	99%	104%	5%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd		nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	110%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71109.3
Client: Washington Department of Fish and Wildlife
Client Job Name: Chopaka Lake
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	Chopaka Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	11/19/07	11/19/07	11/14/07	11/19/07	11/19/07	
Date analyzed	Limits	11/19/07	11/19/07	11/19/07	11/19/07	11/19/07	
Sample collected				11/07/07			
Surrogate recoveries							
2-Fluorophenol		119%			107%	118%	
Phenol-d6		120%			109%	111%	
Nitrobenzene-d5		114%	66%	70%	108%	100%	
2-Fluorobiphenyl		117%	62%	117%	111%	114%	
2,4,6-Tribromophenol		129%			126%	128%	
4-Terphenyl-d14		124%	78%	128%	116%	131%	

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
Acceptable Recovery limits:
2-Flurophenol: 10-135 %
Phenol - d5: 10-135 %
2,4,6- tribromophenol: 29-159%
Nitrobenzene - d5: 20-120 %
2-Flurobiphenyl: 50-150%
p-Terphenyl-d14: 50-150%
Acceptable RPD limit: 35%

POST TREATMENT DISCHARGE MONITORING REPORT

1. **Lake Name:** Blue (Limebelt)

2. **County:** Okanogan

3. **Section:** 6 **Township:** 35N **Range:** 26E

4. **Date of Treatment:** Oct 26, 2007

5. **Purpose of Treatment:** Blue Lake is an important trout fishery, which provides local residents an opportunity to fish a small body of water in a pristine setting. Recent illegal introductions of brown bullhead catfish and largemouth bass have seriously compromised the trout fishing through competition and predation. Angler usage at the lake has dropped off considerably as well prompting a recent WDFW net sampling survey, which indicated poor trout condition and an increasing spiny ray population. Treatment is needed at this time to restore the lake back to trout only water.

6. **Name of Licensed Applicator:** Robert Jateff, WSDA Pesticide License # 74965

7. **Lake Description: Surface Acres:** 16 **Volume:** 240 **Acre Feet:**

   Maximum Depth: 25 feet **Average Depth:** 15 feet

8. **Stream Description: Width:** N/A, **Length:** N/A

   Flow Rate of Stream/Outlet (cu. ft. per sec.): N/A

9. **Name of Fish Toxicant Product Used:** Rotenone Fish Toxicant Powder, Prenfish/CFT Fish Toxicant Liquid

10. **Description of Treatment Method(s):** Powder applied by pumper boats, which mixes chemical with water prior to broadcasting into lake. Backpack sprayer and small canoe used to distribute rotenone in shallow water areas of the lake.

11. **Quantity of Fish Toxicant used (pounds and/or gallons):** 1,100 lbs of powder and 12 gals of liquid

12. **Concentration of rotenone in formulated Rotenone product:** 7.3% in powder and 5.0% in liquid

13. **Concentration of active rotenone in water (ppm):** 3.0 ppm

14. **Water conditions/quality:** Water sampling done within 24hrs pre-treatment:

Depth (m)	Temperature ©	pH	DO
7.4	9.17	8.23	8.30
5.6	9.19	8.23	8.50
3.8	9.24	8.23	8.55
1.7	9.29	8.23	8.77

15. **Detoxification of rotenone treated water (if required): Description of detoxification methods/equipment; potassium permanganate application rate (pounds per hour); flow rate of stream/outlet (cu. ft. per sec.); estimate of average concentration (ppm):** N/A

16. **Description of lake inlets(s)/outlet(s) and any temporary water control measures (if required):** N/A

17. **Period of Toxicity (duration of water quality reduction):** 4-6weeks

18. **Eradicated fish species:** largemouth bass, brown bullheads, brook and tiger trout

19. **Results of pre and post treatment monitoring:** Prior to the treatment, the lake was sampled for various parameters including temperature, pH, and zooplankton. Post sampling included VOC and Semi-VOC both within 24 hours of treatment and 4 weeks post-treatment.

20. **Impact on non-target organisms:** None observed

21. **Brief description of treatment/detoxification and other comments:** The treatment began at 0900 on Oct 26, 2007 and was completed the same day based on a concentration of 3 ppm. The weather was cool with an afternoon wind helping to mix the rotenone throughout the lake. Connecting waters were treated with liquid rotenone, since those portions connect to the main lake in the spring. On Oct 27th, there were hundreds of dead largemouth bass noted in the 2-10 inch range, as well as hundreds of brown bullheads 4-11 inches floating along the shoreline. A small percentage of the brown bullheads were still alive. There were less than twenty-five eastern brook trout 11-12 inches and several tiger trout 13-15 inches dead along the lake edges. On the second day following the treatment, there were fewer brown bullheads alive than the day before, but it appeared that the treatment was not 100% effective in removing the bullhead population. A bioassay with 5 rainbow trout was conducted at 4 weeks and all fish survived, indicating that the lake had detoxified. During May-Sept of 2008, 2,000 triploid eastern brook trout fingerlings and 500 cutthroat trout fingerlings will be planted into the lake.

22. **Copy of the amended FSEIS for lakes/streams treated during the reporting period including all SEPA comments, results and decisions**
23. **List of lakes/streams proposed for treatment during the upcoming year.**

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71101.3
Client: Washington Department of Fish and Wildlife
Client Job Name: Blue Lake (Limebelt)
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	Blue Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			10/27/07			
Date analyzed	Limits	11/08/07	11/08/07	11/08/07	11/08/07	11/08/07	
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
Acetone	10.0	nd		nd			
1,1-Dichloroethene	1.0	nd	94%	nd	98%	91%	7%
Methylene chloride	10.0	nd		nd			
Methyl-t-butyl ether (MTBE)	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
n-Hexane	1.0	nd		nd			
2-Butanone (MEK)	10.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	102%	nd	106%	100%	6%
Trichloroethene (TCE)	1.0	nd	104%	nd	107%	101%	6%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	108%	nd	116%	109%	6%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
2-Hexanone	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene (PCE)	1.0	nd		nd			
1,2-Dibromoethane (EDB)	0.10	nd		nd			
Chlorobenzene	1.0	nd	117%	nd	125%	118%	6%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	1.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

*-Instrument detection limits

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71101.3
Client: Washington Department of Fish and Wildlife
Client Job Name: Blue Lake (Limebelt)
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	Blue Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			10/27/07			
Date analyzed	Limits	11/08/07	11/08/07	11/08/07	11/08/07	11/08/07	
Surrogate recoveries:							
Dibromofluoromethane		134%	126%	132%	128%	129%	
Toluene-d8		105%	105%	107%	108%	106%	
4-Bromofluorobenzene		101%	103%	100%	100%	100%	

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
J - estimated quantitation, below listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71101.3
Client: Washington Department of Fish and Wildlife
Client Job Name: Blue Lake (Limebelt)
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	Blue Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	11/07/07	11/07/07	11/02/07	11/07/07	11/07/07	
Date analyzed	Limits	11/07/07	11/07/07	11/07/07	11/07/07	11/07/07	
Sample collected				10/27/07			
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	75%	78%	4%
2-Chlorophenol	2.0	nd		nd	97%	100%	3%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	101%	nd	105%	107%	2%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexachloroethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	92%	95%	3%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd	37%	41%	10%
2,4-Dimethylphenol	2.0	nd		nd			
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	82%	86%	5%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	116%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	100%	103%	3%
2-Methylnapthalene	2.0	nd		nd			
1-Methylnapthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinotrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	99%	nd	100%	96%	4%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd			
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd		nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd	63%	68%	2%
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	107%	nd			
Pyrene	0.2	nd		nd	83%	86%	4%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd		nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	62%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71101.3
Client: Washington Department of Fish and Wildlife
Client Job Name: Blue Lake (Limebelt)
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	Blue Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	11/07/07	11/07/07	11/02/07	11/07/07	11/07/07	
Date analyzed	Limits	11/07/07	11/07/07	11/07/07	11/07/07	11/07/07	
Sample collected				10/27/07			
Surrogate recoveries							
2-Fluorophenol		73%			93%	98%	
Phenol-d6		82%			97%	103%	
Nitrobenzene-d5		65%	49%	53%	71%	73%	
2-Fluorobiphenyl		92%	75%	112%	127%	129%	
2,4,6-Tribromophenol		66%			106%	116%	
4-Terphenyl-d14		80%	65%	107%	113%	112%	

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
Acceptable Recovery limits:
2-Flurophenol: 10-135 %
Phenol - d5: 10-135 %
2,4,6- tribromophenol: 29-159%
Nitrobenzene - d5: 20-120 %
2-Flurobiphenyl: 50-150%
p-Terphenyl-d14: 50-150%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71210.1
Client: Washington Department of Fish and Wildlife
Client Job Name: Blue Lake Limebelt
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	Blue Lake Limebelt	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			11/29/07			
Date analyzed	Limits	12/12/07	12/12/07	12/12/07	12/12/07	12/12/07	
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
Acetone	10.0	nd		nd			
1,1-Dichloroethene	1.0	nd	106%	nd	103%	108%	5%
Methylene chloride	10.0	nd		nd			
Methyl-t-butyl ether (MTBE)	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
n-Hexane	1.0	nd		nd			
2-Butanone (MEK)	10.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	103%	nd	104%	107%	3%
Trichloroethene (TCE)	1.0	nd	104%	nd	104%	107%	3%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	116%	nd	116%	122%	5%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
2-Hexanone	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene (PCE)	1.0	nd		nd			
1,2-Dibromoethane (EDB)	0.10	nd		nd			
Chlorobenzene	1.0	nd	120%	nd	122%	126%	3%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	1.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

*-instrument detection limits

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71210.1
Client: Washington Department of Fish and Wildlife
Client Job Name: Blue Lake Limebelt
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	Blue Lake Limebelt	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			11/29/07			
Date analyzed	Limits	12/12/07	12/12/07	12/12/07	12/12/07	12/12/07	
Surrogate recoveries:							
Dibromofluoromethane		135%	131%	133%	134%	134%	
Toluene-d8		108%	107%	108%	107%	111%	
4-Bromofluorobenzene		103%	101%	97%	99%	98%	

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
J - estimated quantitation, below listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71210.1
Client: Washington Department of Fish and Wildlife
Client Job Name: Blue Lake Limebelt
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	Blue Lake Limebelt	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/18/07	12/18/07	12/10/07	12/14/07	12/14/07	
Date analyzed	Limits	12/18/07	12/18/07	12/18/07	12/18/07	12/18/07	
Sample collected				11/29/07			
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	71%	73%	3%
2-Chlorophenol	2.0	nd		nd	80%	83%	4%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	77%	nd	72%	72%	0%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexacholorethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	95%	96%	1%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd			
2,4-Dimethylphenol	2.0	nd		nd			
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd			
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	93%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	70%	72%	3%
2-Methylnapthalene	2.0	nd		nd			
1-Methylnapthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinotrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd	63%	71%	12%
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	101%	nd	93%	91%	2%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd	83%	88%	6%
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd		nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd		nd			
Pyrene	0.2	nd	82%	nd	78%	78%	0%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	107%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	54%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghl)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71210.1
Client: Washington Department of Fish and Wildlife
Client Job Name: Blue Lake Limebelt
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	Blue Lake Limebelt	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/18/07	12/18/07	12/10/07	12/14/07	12/14/07	
Date analyzed	Limits	12/18/07	12/18/07	12/18/07	12/18/07	12/18/07	
Sample collected				11/29/07			
Surrogate recoveries							
2-Fluorophenol		46%			42%	44%	
Phenol-d6		51%		21%	51%	53%	
Nitrobenzene-d5		48%	48%	90%	37%	40%	
2-Fluorobiphenyl		84%	94%	82%	75%	72%	
2,4,6-Tribromophenol		71%		29%	72%	83%	
4-Terphenyl-d14		80%	88%	74%	72%	69%	

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
Acceptable Recovery limits:
2-Flurophenol: 10-135 %
Phenol - d5: 10-135 %
2,4,6- tribromophenol: 29-159%
Nitrobenzene - d5: 20-120 %
2-Flurobiphenyl: 50-150%
p-Terphenyl-d14: 50-150%
Acceptable RPD limit: 35%

POST-REHABILITATION REPORT

Waters: Corral, Blythe, Chukar, and Scaup lakes

Location: Seep Lakes Wildlife Area and Columbia National Wildlife Refuge, Sec 14, 15 and 16, T17N, R28E; approximately 15 miles northwest of Othello and 0.5 miles south of the southwest corner of Potholes Reservoir, Grant County, WA

DATES TREATED: October 23-24 and November 1, 2007

PURPOSE: Improve trout survival and growth through the reduction in numbers of undesirable species of fish to the extent possible.

LISENCED APPLICATOR: Jeffrey W Korth, WA Dept Fish and Wildlife (DFW), District 5 Fisheries Biologist, Pesticide License # 39429.

LAKE DESCRIPTIONS full pool and (at treatment, if different):

1. WATER: **Corral Lake**
   Full pool at treatment.
   Surface acres: 77.6 Depth: average ~ 30 ft; maximum 65 feet
   Volume: 2,570 acre-feet Weight of Water: 6,985,630,080 lbs.
   Connectivity: Inlet - No surface connections; subterranean flow, generally from springs to the north end of lake; water from seeps under O'Sullivan Dam (Potholes Reservoir). Outlet - Intermittent, small creek drains to Blythe Lake; 1,600 ft., 2-3 cfs; includes a probable natural barrier (falls) to upstream fish migration at Blythe Lk. No flow during 2007 treatment.

2. WATER: **Blythe Lake**
   Full pool at treatment.
   Surface acres: 32 Depth: average ~ 20 ft; maximum 35 feet
   Volume: 588 acre-feet Weight of Water: 1,598,268,672 lbs
   Connectivity: Inlet - Intermittent, small creek from Corral Lk (see above). Outlet - Intermittent, small creek drains to Chukar Lake; 300 ft., 2-3 cfs. No flow during 2007 treatment.

3. WATER: **Chukar Lake**
   Surface acres: 13.2 (~ 10) Depth: average ~ 15 ft; maximum 24 ft (19 ft)
   Volume: 192 acre-feet Weight of Water: 521,856,000 lbs
   (127 acre-feet) (345,204,288 lbs)
   Connectivity: Inlet - Intermittent stream from Blythe Lk (see above). Outlet – Intermittent stream to Scaup Lake; 60 ft., 2-3 cfs; No connection during 2007 treatment.

4. WATER: **Scaup Lake**
   Surface acres: 9.1 (~ 6) Depth: average ~ 5 ft; maximum 14 ft (9 ft)
   Volume: 64 acre-feet Weight of Water: 173,950,000 lbs.
   (19 acre-feet) (51,644,736 lbs.)
   Connectivity: Inlet - Intermittent stream from Chukar (see above). Outlet - intermittent creek to Marsh Unit 1 (Lower Crab Creek); 400 ft, up to 2-3 cfs seasonally; water rarely flows from Scaup Lk, so Chukar and Scaup become essentially one body of water when water levels are high enough. No connection during 2007 treatment.

TREATMENT DESCRIPTION:

Toxicant used: Rotenone - Cube powdered Fish Toxicant EPA Reg # 6458-6; Liquid CFT Legumine EPA Reg # 75338-2 and Liquid Prenfish EPA Reg # 655-805.

		Actual Rotenone used		
		Powder	Liquid	
Water	Date 2006	lbs @ conc.	gals @ 5%	ppm (product)
1. **Corral Lake**	Oct 23	4,565 @ 7.3 %	20 (Prenfish)	1.0
	Oct 24		3 (Prenfish)	1.0 cumulative
			- liquid includes inlet and outlet ponds	
2. **Blythe Lake**	Oct 23	1,100 @ 6.7 %	0	0.9
	Oct 24		5 (Prenfish)	0.9 cumulative
3. **Chukar Lake**	Nov 1		39 (CFT)	0.9
4. **Scaup Lake**	Nov 1		6 (CFT)	0.9
Equivalent @ 5%	**TOTAL**	**8,138 lbs**	**73 gals**	

All powder slurried with lake water; liquid mixed with lake water and sprayed in shallow waters.

Rotenone concentrations achieved during the treatment were calculated without regard to daily rates of degradation. Precise rates of detoxification on a daily basis were not known. Only enough rotenone was used during the entire treatment to achieve the desired concentrations given an instantaneous treatment (1 ppm product, 0.05 ppm actual rotenone for all lakes). Actual concentrations in the lakes would have been somewhat less since rotenone began degrading on the first day of treatment.

Detoxification Procedures: treated waters naturally detoxified.
No detoxification was necessary; all outflow from system was subterranean.

SPECIES OF FISH ERADICATED IN ORDER OF RELATIVE ABUNDANCE:

Water – Species, Size; observed abundance

1. **Corral Lake**
   - **Pumpkinseed Sunfish** .05-2"; hundreds of thousands (maximum estimate = 500 K)
   - **Black Crappie** 3-6"; hundreds (maximum estimate = 1,000)
   - **Rainbow trout** 16-18"; tens (6 observed, maximum estimate = 30)
   - **Bull frog tadpoles** 2-3"; tens (maximum estimate = 100)

2. **Blythe Lake**
   - **Pumpkinseed Sunfish** .05-2"; hundreds of thousands (maximum estimate = 300 K)
   - **Rainbow trout** 18"; tens (1 observed, maximum estimate = 10)
   - **Bull frog tadpoles** 2-3"; tens (maximum estimate = 100)

3. **Chukar Lake**
   - **Pumpkinseed Sunfish** .05-2"; hundreds of thousands (maximum estimate = 200 K) - a few @ 5"
   - **Rainbow trout** 18"; 1 observed (maximum estimate = 10)

4. **Scaup Lake**
   Pumpkinseed Sunfish .05-2"; thousands (maximum estimate = 10,000)

PHYSICAL CHARACTERISTICS OF THE LAKE DURING TREATMENT:
Pre-treatment water quality parameters – **23 October 2007.**

1. **Corral Lake**

Depth (ft)	Water Temp (°C)	Dissolved Oxygen (mg/l)	pH
surface	11.88	9.00	8.88
10	11.86	8.35	8.98
12	11.61	7.77	8.92
13	10.95	4.85	8.70
14	7.58	0.22	7.83
15	6.94	0.14	7.72
18 (bottom)	6.20	0.07	7.49

2. **Blythe Lake**

Depth (ft)	Water Temp (°C)	Dissolved Oxygen (mg/l)	pH
surface	12.50	7.25	8.88
5	11.99	6.83	8.91
6	11.85	5.91	8.89
7	11.86	5.17	8.88
8	11.83	4.69	8.87
9	11.79	4.31	8.86
10 (bottom)	11.78	3.20	8.85

3. **Chukar Lake**

Depth (ft)	Water Temp (°C)	Dissolved Oxygen (mg/l)	pH	
surface	9.38	11.54	6.31*	*possible instrument failure

PRE- AND POST- TREATMENT MONITORING (all monitoring conducted as outlined in DFW's NPDES permit WA0041009; Chukar and Scaup were considered equivalent bodies of water for these purposes by DFW and DOE.):
Impact to non-targeted organisms – Zooplankton were sampled at Corral, Blythe, and Chukar lakes for diversity and abundance just previous to treatment, six months post treatment, and will again be sampled 12 months post treatment. Samples are currently being processed, and the results will be available by separate report.

Liquid rotenone formulation longevity – Water samples were taken at Corral, Blythe, and Chukar lakes 24 hours and four weeks post treatment to check for residues related to the carriers present in the liquid formulation of rotenone. Water samples were taken in areas of the lake where the heaviest concentrations of liquid rotenone were applied. Samples were sent to an accredited lab for analyses per EPA methods. Samples were analyzed for 64 volatile and semi-volatile organic compounds, including benzene, tolulene, phenol, xylene, and derivatives of these compounds, and detection limits were 0.02-3.0 ug/l, variously.

Corral Lake: Water samples were taken at the launch at the north end of the lake. Prenfish had been used to treat these waters. In the 24 hour sample, 1,2,4-Trimethylbenzene (2.4 ug/l), n-Butylbenzene (13ug/l), and Naphthalene (162 ug/l) were detected. The amounts of all 61 other compounds possibly present in liquid rotenone formulations were below detection limits in the same sample. In the 4-week sample, the amounts of all 64 compounds possibly present in liquid rotenone formulations were below detection limits.

Blythe Lake: Water samples were taken at the launch at the north end of the lake. Prenfish had been used to treat these waters. In the 24-hour sample and the 4-week sample, the amounts of all 64 compounds possibly present in liquid rotenone formulations were below detection limits.

Chukar Lake: Water samples were taken at the west end of the lake. CFT had been used to treat these waters. In the 24-hour sample and the 4-week sample, the amounts of all 64 compounds possibly present in liquid rotenone formulations were below detection limits.

Period of Toxicity – Persistent rotenone toxicity was determined by bioassay. Live trout were held in a live-box (5 gal volume with free flow-through) in the lakes and survival monitored. Trout exhibit signs of stress and lose equilibrium after three hours at rotenone concentrations of 0.05 ppm product (0.0025 ppm actual rotenone) at water temperatures of 47° F, and response is fairly uniform among individuals in similar circumstances. Rotenone is considered below detection limits when trout remain alive for at least 48 hours. Individual mortalities within a group of trout frequently occur due to mechanical damage when handled or transported/confined in relatively small containers.

Corral Lake: Bioassay began 33 days post-treatment. Six 3-5 inch rainbow trout were placed in a live-box at the north end of the lake. No sign of distress was observed after an hour in the lake. After 48 hours in the lake, one trout had perished. Rotenone toxicity was determined to be below detection limits, and the single trout mortality was determined to be due to other factors (mechanical damage during transport or captivity).

Blythe Lake: Bioassay began 33 days post-treatment. Seven 3-5 inch rainbow trout were placed in a live-box at the north end of the lake. No sign of distress was observed after an hour in the lake. After 48 hours in the lake, one trout had perished. Rotenone toxicity was determined to be below detection limits, and the single trout mortality was determined to be due to other factors (mechanical damage during transport or captivity).

Chukar Lake: Bioassay began 28 days post-treatment. Ten 3-5 inch rainbow trout, all survivors of the Corral and Blythe bioassays, were placed in a live-box at the west end of the lake. No sign of distress was observed after an hour in the lake. After 96 hours in the lake, four of 10 trout were healthy. Rotenone toxicity was determined to be below detection limits, and the trout mortalities were determined to be due to other factors (mechanical damage during transport or captivity).

GENERAL DESCRIPTION OF TREATMENT PROJECT AND OTHER COMMENTS:
A fall treatment for the 2007 treatment of Corral, Blythe, Chukar, and Scaup lakes was chosen primarily to ensure a lack of flow from the system into Crab Creek. Low water due to summer heat and evaporation at Corral and Blythe result in minimal or non-existent fall flows. While water levels have been low year around, and no outflow from Scaup Lake has been observed for years, a spring treatment would risk possible heavy winter run-off. A spring rehab would have the advantage of being pre-spawn for centrarchids, but most target species should have been finished spawning by mid October with the possible exception of the sunfish. Centrarchid eggs hatch in a few days and the fry would have then been susceptible to rotenone poisoning. Lastly, a fall rehab allows for early spring stocking of catchables and a fishery in Corral Lake, a popular year around fishery.

Corral and Blythe Lakes

The treatment of Corral and Blythe Lakes commenced October 23, 2007 and was accomplished over a two-day period. Conditions were generally favorable. Weather was clear and sunny. Light WNW winds (0-3 mph) prevailed. Water temperature was in the low 50°F range - cool enough to retain a reasonable length of toxicity, and warm enough that fish were still fairly active. A thermocline existed in Corral Lake between 13 and 14 feet, and DO was less than 1 ppm below 13 feet. Blythe Lake was fairly well mixed.

Rotenone was loaded and delivered the morning of the treatment. A crew of 8 DFW employees was present. The treatment was staged at the DFW access on the north end of Corral Lk. Four crewed the two pumper-boats used to slurry the powdered rotenone with lake water, two crewed the airboat for liquid rotenone application, and a crew of two managed shoreline operations and supervision. The powdered rotenone application was finished in Corral Lake by noon (~ 3 hrs), and both pumper boats then repaired to Blythe Lake. Powdered rotenone application there was finished by 4 pm (~ 2 hrs). The airboat sprayed the shallow shorelines of Corral Lake, especially the northwest bays and outlet areas. An ATV was used to spray standing water in the outlet stream, and a canoe was used to spray the northeast beaver pond. The next day, the airboat sprayed the shallow shorelines of Blythe Lake, especially the island and outlet areas. Canoe spraying continued on the inlet pond and isolated pond to the north of Corral Lake.

Upon re-visiting Chukar Lake, it was determined that getting equipment to the lake and boats in the water would result in much habitat damage and also likely result in the use of either heavy equipment or a rather large towing bill. Scaup Lake was small enough that it might have been done with a canoe, but without treating Chukar Lake, the treatment of both waters was postponed until a flying service could be retained. On November 1, 2007, a helicopter was used to spray liquid rotenone on Chukar and Scaup Lakes. Again, conditions were generally favorable. Weather was clear and sunny with a light WNW winds (0-5 mph). Water temperature was 45°F. The entire treatment took about an hour.

The success of the treatment in terms of fish eradication was very good. At Corral and Blythe lakes, fish began to stress and die by the end of the first day of treatment. No live fish were observed in Corral Lake by the second day, although live fish were observed in Blythe in those areas later treated by airboat. By the end of the treatment, no live fish were observed in either water. As expected, pumpkinseed sunfish were the most numerous species observed. Likewise, the relative paucity of rainbow trout was also as predicted. Some of the rainbow had sunfish in their stomachs. While the presence and numbers of crappie in Corral Lake were as expected, the lack of this species in any of the downstream waters was odd. Sunfish were found in the beaver pond in the northeast bay and in the isolated pond, but not in the inlet pond near the access. In addition to the fish, relatively small numbers of bullfrog tadpoles were found dead and stressed a day after the treatment of Corral and Blythe lakes was complete. Bullfrog tadpoles are fairly hardy and require 4 ppm rotenone for efficient eradication. At 1 ppm rotenone, it was likely that most survived.

Sunfish began to stress (within 30 minutes) and die very quickly after the treatment of Chukar and Scaup lakes was complete. Only the CFT formulation of liquid rotenone was used in this application. No live fish were observed in either water by the next day. While Chukar Lake had hundreds of thousands of sunfish eradicated, Scaup Lake had a relative few, even given its smaller size. Scaup Lake may winter kill in part due its very low level and lack of flow through during that season. An old beaver dam in the channel connecting Chukar and Scaup may also prevent fish movement between the two lakes during high water.

Cost: About 19 man-days (man-day = 8 hrs) were required to complete the treatment of Corral, Blythe, Chukar, and Scaup lakes from pre-treatment preparation (signing, sampling, rotenone and equipment transport) through treatment, clean up, and travel. Total cost of the treatment alone (rotenone, labor - $268/day, travel, expendable equipment) was approximately $25,000, including about $5,000 for labor during the treatment and $18,433 for rotenone (8,138 lbs powder @ $1.65/lb @ 5%, delivered; 73 gal liquid @ $55-77/gal). Estimated time for pre-rehabilitation proposals, general public outreach, post-rehabilitation sampling and reports added 8 days.

Epilogue: Corral Lake was stocked in March 2008 with 16,000 catchable-sized rainbow (10-12"). These provided a fair fishery and good participation through April. Fingerling trout stocking in Corral, Blythe, Chukar, and Scaup lakes was delayed until April 2008 to allow zooplankton and insect populations to recover. Over 45,000 fingerling rainbow have been stocked to date, and the 2009 season fingerling-based fisheries are much anticipated by anglers and biologists alike.

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71026.1
Client: Washington Department of Fish and Wildlife
Client Job Name: Corral Lake
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	Corral Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
	Reporting						
Date analyzed	Limits	10/26/07	10/26/07	10/26/07	10/26/07	10/26/07	
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
Acetone	10.0	nd		nd			
1,1-Dichloroethene	1.0	nd	81%	nd	95%	99%	4%
Methylene chloride	10.0	nd		nd			
Methyl-t-butyl ether (MTBE)	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
n-Hexane	1.0	nd		nd			
2-Butanone (MEK)	10.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	94%	nd	92%	97%	5%
Trichloroethene (TCE)	1.0	nd	95%	nd	95%	100%	5%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	105%	nd	108%	112%	4%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
2-Hexanone	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene (PCE)	1.0	nd		nd			
1,2-Dibromoethane (EDB)	0.10	nd		nd			
Chlorobenzene	1.0	nd	111%	nd	112%	117%	4%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	1.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		2.4			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		13			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		162			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

*-instrument detection limits

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ESN Job Number: S71026.1
Client: Washington Department of Fish and Wildlife
Client Job Name: Corral Lake
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Analytical Results

8260, µg/L		MTH BLK	LCS	Corral Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
	Reporting						
Date analyzed	Limits	10/26/07	10/26/07	10/26/07	10/26/07	10/26/07	
Surrogate recoveries:							
Dibromofluoromethane		111%	107%	115%	106%	107%	
Toluene-d8		99%	97%	100%	99%	98%	
4-Bromofluorobenzene		95%	96%	91%	95%	95%	

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
J - estimated quantitation, below listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71026.1
Client: Washington Department of Fish and Wildlife
Client Job Name: Corral Lake
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	Corral Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	
Date analyzed	Limits	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	125%	127%	2%
2-Chlorophenol	2.0	nd		nd	102%	106%	4%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	101%	nd	44%	44%	0%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexacholorethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	103%	107%	4%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd	35%	37%	6%
2,4-Dimethylphenol	2.0	nd		nd			
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	68%	70%	3%
Naphthalene	2.0	nd		23			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	119%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	60%	61%	2%
2-Methylnapthalene	2.0	nd		3.3			
1-Methylnapthalene	2.0	nd		1.7			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinotrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	104%	nd	99%	103%	4%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd			
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd		nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd	25%	27%	2%
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	112%	nd			
Pyrene	0.2	nd		nd	69%	73%	6%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd		nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	57%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71026.1
Client: Washington Department of Fish and Wildlife
Client Job Name: Corral Lake
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	Corral Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	
Date analyzed	Limits	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	

Surrogate recoveries						
2-Fluorophenol	108%			115%	109%	
Phenol-d6	106%			106%	100%	
Nitrobenzene-d5	84%	51%	49%	45%	45%	
2-Fluorobiphenyl	111%	70%	109%	84%	93%	
2,4,6-Tribromophenol	111%			76%	77%	
4-Terphenyl-d14	103%	53%	100%	63%	66%	

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
Acceptable Recovery limits:
2-Flurophenol: 10-135 %
Phenol - d5: 10-135 %
2,4,6- tribromophenol: 29-159%
Nitrobenzene - d5: 20-120 %
2-Flurobiphenyl: 50-150%
p-Terphenyl-d14: 50-150%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71129.2
Client: Washington Department of Fish and Wildlife
Client Job Name: Corral Lake
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	Corral Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			11/27/07			
Date analyzed	Limits	12/04/07	12/04/07	12/04/07	12/04/07	12/04/07	
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
Acetone	10.0	nd		nd			
1,1-Dichloroethene	1.0	nd	108%	nd	114%	104%	9%
Methylene chloride	10.0	nd		nd			
Methyl-t-butyl ether (MTBE)	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
n-Hexane	1.0	nd		nd			
2-Butanone (MEK)	10.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	106%	nd	111%	104%	7%
Trichloroethene (TCE)	1.0	nd	108%	nd	130%	121%	7%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	116%	nd	120%	112%	7%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
2-Hexanone	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene (PCE)	1.0	nd		nd			
1,2-Dibromoethane (EDB)	0.10	nd		nd			
Chlorobenzene	1.0	nd	135%	nd	129%	120%	7%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	1.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

*-instrument detection limits

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71129.2
Client: Washington Department of Fish and Wildlife
Client Job Name: Corral Lake
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	Corral Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			11/27/07			
Date analyzed	Limits	12/04/07	12/04/07	12/04/07	12/04/07	12/04/07	
Surrogate recoveries:							
Dibromofluoromethane		133%	132%	132%	132%	132%	
Toluene-d8		109%	108%	108%	108%	108%	
4-Bromofluorobenzene		98%	96%	96%	94%	91%	

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
J - estimated quantitation, below listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71129.2
Client: Washington Department of Fish and Wildlife
Client Job Name: Corral Lake
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	Corral Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/03/07	12/03/07	11/30/07	11/30/07	11/30/07	
Date analyzed	Limits	12/03/07	12/03/07	12/03/07	12/03/07	12/03/07	
Sample collected				12/27/07			
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	100%	101%	1%
2-Chlorophenol	2.0	nd		nd	105%	107%	2%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	120%	nd	103%	107%	4%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexacholorethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	113%	113%	0%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd	72%	74%	3%
2,4-Dimethylphenol	2.0	nd		nd			
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd			
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	118%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	79%	80%	1%
2-Methylnapthalene	2.0	nd		nd			
1-Methylnapthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinotrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	101%	nd	91%	93%	2%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd			
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd		nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd	101%	103%	2%
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	116%	nd			
Pyrene	0.2	nd		nd	101%	102%	1%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	69%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	106%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71129.2
Client: Washington Department of Fish and Wildlife
Client Job Name: Corral Lake
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	Corral Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/03/07	12/03/07	11/30/07	11/30/07	11/30/07	
Date analyzed	Limits	12/03/07	12/03/07	12/03/07	12/03/07	12/03/07	
Sample collected				12/27/07			
Surrogate recoveries							
2-Fluorophenol		78%		71%	122%	101%	
Phenol-d6		84%		77%	118%	103%	
Nitrobenzene-d5		120%	92%	71%	93%	95%	
2-Fluorobiphenyl		126%	75%	98%	105%	105%	
2,4,6-Tribromophenol		133%		122%	127%	100%	
4-Terphenyl-d14		118%	77%	114%	106%	110%	

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
Acceptable Recovery limits:
2-Flurophenol: 10-135 %
Phenol - d5: 10-135 %
2,4,6- tribromophenol: 29-159%
Nitrobenzene - d5: 20-120 %
2-Flurobiphenyl: 50-150%
p-Terphenyl-d14: 50-150%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71026.2
Client: Washington Department of Fish and Wildlife
Client Job Name: Blythe Lake
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS Blythe Lake		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
	Reporting						
Date analyzed	Limits	10/26/07	10/26/07	10/26/07	10/26/07	10/26/07	
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
Acetone	10.0	nd		nd			
1,1-Dichloroethene	1.0	nd	81%	nd	95%	99%	4%
Methylene chloride	10.0	nd		nd			
Methyl-t-butyl ether (MTBE)	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
n-Hexane	1.0	nd		nd			
2-Butanone (MEK)	10.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	94%	nd	92%	97%	5%
Trichloroethene (TCE)	1.0	nd	95%	nd	95%	100%	5%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	105%	nd	108%	112%	4%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
2-Hexanone	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene (PCE)	1.0	nd		nd			
1,2-Dibromoethane (EDB)	0.10	nd		nd			
Chlorobenzene	1.0	nd	111%	nd	112%	117%	4%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	1.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

*-instrument detection limits

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71026.2
Client: Washington Department of Fish and Wildlife
Client Job Name: Blythe Lake
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	Blythe Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
	Reporting						
Date analyzed	Limits	10/26/07	10/26/07	10/26/07	10/26/07	10/26/07	
Surrogate recoveries:							
Dibromofluoromethane		111%	107%	111%	106%	107%	
Toluene-d8		99%	97%	101%	99%	98%	
4-Bromofluorobenzene		95%	96%	97%	95%	95%	

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
J - estimated quantitation, below listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71026.2
Client: Washington Department of Fish and Wildlife
Client Job Name: Blythe Lake
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	Blythe Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	
Date analyzed	Limits	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	125%	127%	2%
2-Chlorophenol	2.0	nd		nd	102%	106%	4%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	101%	nd	44%	44%	0%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexacholorethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	103%	107%	4%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd	35%	37%	6%
2,4-Dimethylphenol	2.0	nd		nd			
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	68%	70%	3%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	119%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	60%	61%	2%
2-Methylnapthalene	2.0	nd		nd			
1-Methylnapthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinotrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	104%	nd	99%	103%	4%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd			
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd		nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd	25%	27%	2%
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	112%	nd			
Pyrene	0.2	nd		nd	69%	73%	6%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd		nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	57%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71026.2
Client: Washington Department of Fish and Wildlife
Client Job Name: Blythe Lake
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	Blythe Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	
Date analyzed	Limits	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	
Surrogate recoveries							
2-Fluorophenol		108%			115%	109%	
Phenol-d6		106%			106%	100%	
Nitrobenzene-d5		84%	51%	52%	45%	45%	
2-Fluorobiphenyl		111%	70%	121%	84%	93%	
2,4,6-Tribromophenol		111%			76%	77%	
4-Terphenyl-d14		103%	53%	116%	63%	66%	

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
Acceptable Recovery limits:
2-Flurophenol: 10-135 %
Phenol - d5: 10-135 %
2,4,6- tribromophenol: 29-159%
Nitrobenzene - d5: 20-120 %
2-Flurobiphenyl: 50-150%
p-Terphenyl-d14: 50-150%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71129.1
Client: Washington Department of Fish and Wildlife
Client Job Name: Blythe Lake
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	Blythe Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			11/27/07			
Date analyzed	Limits	12/04/07	12/04/07	12/04/07	12/04/07	12/04/07	
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
Acetone	10.0	nd		nd			
1,1-Dichloroethene	1.0	nd	108%	nd	114%	104%	9%
Methylene chloride	10.0	nd		nd			
Methyl-t-butyl ether (MTBE)	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
n-Hexane	1.0	nd		nd			
2-Butanone (MEK)	10.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	106%	nd	111%	104%	7%
Trichloroethene (TCE)	1.0	nd	108%	nd	130%	121%	7%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	116%	nd	120%	112%	7%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
2-Hexanone	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene (PCE)	1.0	nd		nd			
1,2-Dibromoethane (EDB)	0.10	nd		nd			
Chlorobenzene	1.0	nd	135%	nd	129%	120%	7%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	1.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

*-instrument detection limits

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71129.1
Client: Washington Department of Fish and Wildlife
Client Job Name: Blythe Lake
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	Blythe Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			11/27/07			
Date analyzed	Limits	12/04/07	12/04/07	12/04/07	12/04/07	12/04/07	
Surrogate recoveries:							
Dibromofluoromethane		133%	132%	133%	132%	132%	
Toluene-d8		109%	108%	109%	108%	108%	
4-Bromofluorobenzene		98%	96%	94%	94%	91%	

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
J - estimated quantitation, below listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71129.1
Client: Washington Department of Fish and Wildlife
Client Job Name: Blythe Lake
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	Blythe Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/03/07	12/03/07	11/30/07	11/30/07	11/30/07	
Date analyzed	Limits	12/03/07	12/03/07	12/03/07	12/03/07	12/03/07	
Sample collected				12/27/07			
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	100%	101%	1%
2-Chlorophenol	2.0	nd		nd	105%	107%	2%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	120%	nd	103%	107%	4%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexacholorethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	113%	113%	0%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd	72%	74%	3%
2,4-Dimethylphenol	2.0	nd		nd			
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd			
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	118%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	79%	80%	1%
2-Methylnapthalene	2.0	nd		nd			
1-Methylnapthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinotrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	101%	nd	91%	93%	2%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd			
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd		nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd	101%	103%	2%
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	116%	nd			
Pyrene	0.2	nd		nd	101%	102%	1%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	69%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	106%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71129.1
Client: Washington Department of Fish and Wildlife
Client Job Name: Blythe Lake
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	Blythe Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/03/07	12/03/07	11/30/07	11/30/07	11/30/07	
Date analyzed	Limits	12/03/07	12/03/07	12/03/07	12/03/07	12/03/07	
Sample collected				12/27/07			
Surrogate recoveries							
2-Fluorophenol		78%		76%	122%	101%	
Phenol-d6		84%		84%	118%	103%	
Nitrobenzene-d5		120%	92%	71%	93%	95%	
2-Fluorobiphenyl		126%	75%	103%	105%	105%	
2,4,6-Tribromophenol		133%		110%	127%	100%	
4-Terphenyl-d14		118%	77%	117%	106%	110%	

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
Acceptable Recovery limits:
2-Flurophenol: 10-135 %
Phenol - d5: 10-135 %
2,4,6- tribromophenol: 29-159%
Nitrobenzene - d5: 20-120 %
2-Flurobiphenyl: 50-150%
p-Terphenyl-d14: 50-150%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71106.2
Client: Washington Department of Fish and Wildlife
Client Job Name: Chukar-Scaup Lakes
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	Chukar-Scaup Lakes	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			11/02/07			
Date analyzed	Limits	11/08/07	11/08/07	11/08/07	11/08/07	11/08/07	
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
Acetone	10.0	nd		nd			
1,1-Dichloroethene	1.0	nd	94%	nd	98%	91%	7%
Methylene chloride	10.0	nd		nd			
Methyl-t-butyl ether (MTBE)	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
n-Hexane	1.0	nd		nd			
2-Butanone (MEK)	10.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	102%	nd	106%	100%	6%
Trichloroethene (TCE)	1.0	nd	104%	nd	107%	101%	6%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	108%	nd	116%	109%	6%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
2-Hexanone	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene (PCE)	1.0	nd		nd			
1,2-Dibromoethane (EDB)	0.10	nd		nd			
Chlorobenzene	1.0	nd	117%	nd	125%	118%	6%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	1.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

*-instrument detection limits

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71106.2
Client: Washington Department of Fish and Wildlife
Client Job Name: Chukar-Scaup Lakes
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	Chukar-Scaup Lakes	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			11/02/07			
Date analyzed	Limits	11/08/07	11/08/07	11/08/07	11/08/07	11/08/07	
Surrogate recoveries:							
Dibromofluoromethane		134%	126%	133%	128%	129%	
Toluene-d8		105%	105%	106%	108%	106%	
4-Bromofluorobenzene		101%	103%	100%	100%	100%	

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
J - estimated quantitation, below listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71106.2
Client: Washington Department of Fish and Wildlife
Client Job Name: Chukar-Scaup Lakes
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	Chukar-Scaup Lakes	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	11/07/07	11/07/07	11/07/07	11/07/07	11/07/07	
Date analyzed	Limits	11/07/07	11/07/07	11/07/07	11/07/07	11/07/07	
Sample collected				11/02/07			
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	75%	78%	4%
2-Chlorophenol	2.0	nd		nd	97%	100%	3%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	101%	nd	105%	107%	2%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexacholorethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	92%	95%	3%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd	37%	41%	10%
2,4-Dimethylphenol	2.0	nd		nd			
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	82%	86%	5%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	116%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	100%	103%	3%
2-Methylnapthalene	2.0	nd		nd			
1-Methylnapthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinotrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	99%	nd	100%	96%	4%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd			
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd		nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd	63%	68%	2%
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	107%	nd			
Pyrene	0.2	nd		nd	83%	86%	4%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd		nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	62%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71106.2
Client: Washington Department of Fish and Wildlife
Client Job Name: Chukar-Scaup Lakes
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	Chukar-Scaup Lakes	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	11/07/07	11/07/07	11/07/07	11/07/07	11/07/07	
Date analyzed	Limits	11/07/07	11/07/07	11/07/07	11/07/07	11/07/07	
Sample collected				11/02/07			
Surrogate recoveries							
2-Fluorophenol		73%			93%	98%	
Phenol-d6		82%			97%	103%	
Nitrobenzene-d5		65%	49%	51%	71%	73%	
2-Fluorobiphenyl		92%	75%	124%	127%	129%	
2,4,6-Tribromophenol		66%			106%	116%	
4-Terphenyl-d14		80%	65%	113%	113%	112%	

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
Acceptable Recovery limits:
2-Flurophenol: 10-135 %
Phenol - d5: 10-135 %
2,4,6- tribromophenol: 29-159%
Nitrobenzene - d5: 20-120 %
2-Flurobiphenyl: 50-150%
p-Terphenyl-d14: 50-150%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71130.1
Client: Washington Department of Fish and Wildlife
Client Job Name: Chukar-Scaup Lake
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	Chukar-Scaup Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			11/29/07			
Date analyzed	Limits	12/07/07	12/07/07	12/07/07	12/07/07	12/07/07	
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
Acetone	10.0	nd		nd			
1,1-Dichloroethene	1.0	nd	106%	nd	107%	106%	1%
Methylene chloride	10.0	nd		nd			
Methyl-t-butyl ether (MTBE)	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
n-Hexane	1.0	nd		nd			
2-Butanone (MEK)	10.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	102%	nd	102%	102%	0%
Trichloroethene (TCE)	1.0	nd	104%	nd	104%	102%	2%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	116%	nd	115%	117%	2%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
2-Hexanone	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene (PCE)	1.0	nd		nd			
1,2-Dibromoethane (EDB)	0.10	nd		nd			
Chlorobenzene	1.0	nd	124%	nd	120%	122%	2%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	1.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

*-Instrument detection limits

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S71130.1
Client: Washington Department of Fish and Wildlife
Client Job Name: Chukar-Scaup Lake
Client Job Number:

Analytical Results

8260, µg/L		MTH BLK	LCS	Chukar-Scaup Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			11/29/07			
Date analyzed	Limits	12/07/07	12/07/07	12/07/07	12/07/07	12/07/07	
Surrogate recoveries:							
Dibromofluoromethane		101%	121%	115%	124%	122%	
Toluene-d8		107%	108%	109%	108%	107%	
4-Bromofluorobenzene		97%	100%	100%	98%	100%	

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
J - estimated quantitation, below listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71130.1
Client: Washington Department of Fish and Wildlife
Client Job Name: Chukar-Scaup Lake
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	Chukar-Scaup Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/03/07	12/03/07	11/30/07	11/30/07	11/30/07	
Date analyzed	Limits	12/03/07	12/03/07	12/03/07	12/03/07	12/03/07	
Sample collected				11/29/07			
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	100%	101%	1%
2-Chlorophenol	2.0	nd		nd	105%	107%	2%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	120%	nd	103%	107%	4%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexacholorethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	113%	113%	0%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd	72%	74%	3%
2,4-Dimethylphenol	2.0	nd		nd			
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd			
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	118%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	79%	80%	1%
2-Methylnapthalene	2.0	nd		nd			
1-Methylnapthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinotrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	101%	nd	91%	93%	2%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd			
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd		nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd	101%	103%	2%
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	116%	nd			
Pyrene	0.2	nd		nd	101%	102%	1%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	69%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	106%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S71130.1
Client: Washington Department of Fish and Wildlife
Client Job Name: Chukar-Scaup Lake
Client Job Number:

Analytical Results

8270, µg/L		MTH BLK	LCS	Chukar-Scaup Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/03/07	12/03/07	11/30/07	11/30/07	11/30/07	
Date analyzed	Limits	12/03/07	12/03/07	12/03/07	12/03/07	12/03/07	
Sample collected				11/29/07			
Surrogate recoveries							
2-Fluorophenol		78%		72%	122%	101%	
Phenol-d6		84%		84%	118%	103%	
Nitrobenzene-d5		120%	92%	56%	93%	95%	
2-Fluorobiphenyl		126%	75%	86%	105%	105%	
2,4,6-Tribromophenol		133%		130%	127%	100%	
4-Terphenyl-d14		118%	77%	94%	106%	110%	

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
Acceptable Recovery limits:
2-Flurophenol: 10-135 %
Phenol - d5: 10-135 %
2,4,6- tribromophenol: 29-159%
Nitrobenzene - d5: 20-120 %
2-Fluroblphenyl: 50-150%
p-Terphenyl-d14: 50-150%
Acceptable RPD limit: 35%

POST-REHABILITATION REPORT

Waters: Sprague Lake and inlet/outlet drainages including Negro Creek, Dixon's Pond, Cow Creek, Hallin Lake, Cow Lake, Finnell Lake to Sheep Springs.

Location: Sprague Lake is about one mile southeast of Sprague, WA and about 35 miles southeast of Spokane, WA. The lake and drainage are split between Adams County and Lincoln County:
Lincoln County - Section 1, 12, Township 20 North, Range 37 East; Section 5, 6, 7, Township 20 North, Range 38 East; Section 21, 22, 23, 24, 28, 29, 31, 32, Township 21 North, Range 38 East; Section 13, 14, 19, 22, 23, 26, 27, 28, 29, 30, Township 21 North, Range 39 East.
Adams County - Section 2, 10, 11, 15, 16, 20, 21, Township 19 North, Range 37 East; Section 11, 12, 14, 23, 26, 35, Township 20 North, Range 37 East, Section 36, Township 19 North, Range 36 East, Section 2, Township 18 North, Range 36 East.

DATES TREATED: October 1-12, 2007

PURPOSE: To improve bass, bluegill, crappie, catfish, and trout survival and growth through the reduction in numbers of undesirable species of fish to the extent possible.

LISENCED APPLICATORS: Jeffrey W Korth, WA Dept. Fish and Wildlife (DFW), District 5 Fisheries Biologist, Wash. Dept. of Agriculture Pesticide License # 39429; Robert Jateff, WA Dept. Fish and Wildlife (DFW), District 6 Fisheries Biologist, Pesticide License # 74965; Jon Anderson, WA Dept Fish and Wildlife (DFW) Freshwater Native Species Fisheries Coordinator, Pesticide License # 69176; Randall Osborne, WA Dept. Fish and Wildlife (DFW), Fish and Wildlife Biologist, Pesticide License # 74886; and Marc J. Divens, WA Dept. Fish and Wildlife (DFW), Fish and Wildlife Biologist, Pesticide License # 74881.

LAKE DESCRIPTIONS (at treatment):

1. WATER: **Dixon's Pond /Negro Creek**
   Surface acres: 25 — Depth: average ~ 3 ft; maximum 6 feet
   Volume: 75 acre-feet — Weight of Water: 203,860,800 lbs.
   Connectivity: Inlet - No surface connections; seepage through Fishtrap Lake dam. Outlet - Intermittent, Negro Creek drains to Sprague Lake; roughly 4 of 11 miles were treated. No flow to Sprague Lake during 2007 treatment. Damage Creek was dry and was NOT treated.

2. WATER: **Sprague Lake**
   Surface acres: 1,860 — Depth: average ~ 11 ft; maximum 20 feet
   Volume: 19,650 acre-feet — Weight of Water: 53,411,529,600 lbs
   Connectivity: Inlet - Negro Creek from Fishtrap Lake; intermittent (see above). Outlet - Cow Creek; intermittent. About 2 cfs outflow during 2007 treatment.

3. WATER: **Cow Creek** (to Hallin Lake)
   Surface acres: NA ~ 14.5 miles — Depth: NA
   Volume: 7 acre-feet — Weight of Water: 19,027,008 lbs
   Connectivity: Inlet - Intermittent stream from Sprague Lake (see above). Outlet – Intermittent stream to Hallin Lake; 14.5 miles, 2-3 cfs during 2007 treatment. Lugenbeal Springs did not flow into Cow Creek and was NOT treated.

POST TREATMENT DISCHARGE MONITORING REPORT

1. **Lake Name:** Chopaka

2. **County:** Okanogan

3. **Section:** 4 **Township:** 39N **Range:** 25E

4. **Date of Treatment:** Sept 25, 2007

5. **Purpose of Treatment:** Chopaka Lake has been one of the premier fly-fishing trout waters in the state of Washington for many years. Illegal introductions of smallmouth bass back in the 1980's seemed to show no ill effects on the trout fishery, but in recent years, the bass population has increased to the point where trout survival has been compromised. Fingerling trout plants have produced very few yearling fish the following spring and the trout population structure has been skewed to reveal just a few large individual fish inhabiting the lake. In addition, late spring sampling of smallmouth bass indicated that much of the stomach contents of the bass contained remnants of the smaller-size rainbow plants. Planting larger rainbow trout could prolong the fishery, but are much more expensive to produce at the hatcheries and could be used at other less productive waters instead. Whereas this might be an attractive alternative, it does not solve the problem of an increasing bass population and subsequent future effects on the fishery. In order to provide a quality fishing experience for the type of angler that fishes Chopaka, a trout only concept must be used. The fact that bass are caught on a regular basis by anglers diminishes the aesthetics and has contributed to a severe decline in angler use of the lake. Treatment of the lake is needed to restore the quality fishery that once existed.

6. **Name of Licensed Applicator:** Robert Jateff, WSDA Pesticide License # 74965

7. **Lake Description: Surface Acres:** 149 **Volume:** 6,556 **Acre Feet:**

   Maximum Depth: 79 **Average Depth:** 44

8. **Stream Description: Width:** N/A, **Length:** N/A

   Flow Rate of Stream/Outlet (cu. ft. per sec.): N/A

9. **Name of Fish Toxicant Product Used:** Rotenone Fish Toxicant Powder, Prenfish Fish Toxicant Liquid

10. **Description of Treatment Method(s):** Powder applied by pumper boats, which mixes chemical with water prior to broadcasting into lake. Air boat used to apply liquid rotenone to shallow water areas.

11. **Quantity of Fish Toxicant used (pounds and/or gallons):** 11,715 lbs of powder and 5 gals of liquid

4. WATER: **Hallin Lake**
   Surface acres: 33 Depth: average ~ 2 ft; maximum 14 ft
   Volume: 70 acre-feet Weight of Water: 190,270,080 lbs.
   Connectivity: Inlet – Cow Creek, intermittent stream from Sprague Lake (see above). Outlet - intermittent creek to Cow Lake; 900 ft, up to 2-3 cfs during 2007 treatment.

5. WATER: **Cow Lake**
   Surface acres: 240 Depth: average ~ 6 ft; maximum 21 ft
   Volume: 1,300 acre-feet Weight of Water: 3,533,587,200 lbs.
   Connectivity: Inlet – from Hallin Lake (see above). Outlet – Cow Creek, intermittent to Finnell Lake during 2007 treatment.

6. WATER: **Finnell Lake** (including Sheep Springs)
   Surface acres: 31 Depth: average ~ 6 ft; maximum 13 ft
   Volume: 186 acre-feet Weight of Water: 505,574,784 lbs.
   Connectivity: Inlet – from Cow Lake (see above). Outlet – Cow Creek, intermittent to Sheep Springs. No flow from Sheep Springs during 2007 treatment.

TREATMENT DESCRIPTION:

Toxicant used: Rotenone - Cube powdered Fish Toxicant EPA Reg # 6458-6; Liquid Noxfish EPA Reg # 655-805 and Liquid Prenfish EPA Reg # 655-422.

		Actual Rotenone used		
		Powder	Liquid	
Water	Date 2006	lbs @ conc.	gals @ 5%	ppm (product)
1. **Dixon's Pond &**	Oct 1		20 (Prenfish)	
Negro Creek	Oct 2	275 @ 6.0 %	20 (Prenfish)	
	Oct 3		24 (Prenfish)	
	Oct 11		12 (Prenfish)	
	Oct 12		3 (Prenfish) 79	3.0 cumulative
2. **Sprague Lake**	Oct 8		300 (Prenfish)	
			30 (Noxfish)	
	Oct 9	44,000 @ 7.3 %	30 (Prenfish)	
	Oct 10	26,400 @ 7.3 % 70.4	8 (Prenfish)	2.0 cumulative
3. **Cow Creek (to Hallin Lake)**	Oct 4		20 (Prenfish)	3.0 cumulative
4. **Cow Lake/Creek, Hallin Lake,**	Oct 5		30 (Prenfish)	
Finnell Lake, Sheep Springs			360 (Noxfish)	3.0 cumulative*
5. **Cow Lake**	Oct 5	4,510 @ 6.7 %		3.0 cumulative
6. **Finnell Lake**	Oct 8		60 (Prenfish)	3.0 cumulative
Equivalent @ 5%	**TOTAL**	**109,157 lbs**	**917 gals**	

All powdered product was slurried with lake water; liquid formulations were dispensed by boat by being mixed with lake water and sprayed in shallow waters, or sprayed from helicopter.

Rotenone concentrations achieved during the treatment were calculated without regard to daily rates of degradation. Precise rates of detoxification on a daily basis were not known. Only enough rotenone was used during the entire treatment to achieve the desired concentrations based on an instantaneous treatment (2-3 ppm product, 0.10-0.15 ppm active ingredient of rotenone, for all lakes and stream sections). Actual concentrations in the lakes would have been somewhat less since rotenone began degrading on the first day of treatment.

Detoxification Procedures: treated waters naturally detoxified.
No detoxification was necessary; all outflow from system was subterranean.

SPECIES OF FISH ERADICATED IN ORDER OF RELATIVE ABUNDANCE:

Water – Species

1. **Negro Creek & Ponds**
   Carp, Brown Bullheads, Redfin (Grass) pickerel, Tench, Black Crappie, Pumpkinseed Sunfish, Yellow Perch, Largemouth Bass, Bluegill

2. **Sprague Lake**
   Carp, Black Crappie, Walleye, Brown Bullheads, Tench, Channel Catfish, Pumpkinseed Sunfish, Bluegill, Yellow Perch, Largemouth Bass, Smallmouth Bass, Redfin pickerel, Sculpins

3. **Cow Creek**
   Carp, Redfin Pickerel, Tench, Brown Bullheads, Black Crappie, Pumpkinseed Sunfish, Yellow Perch, Largemouth Bass, Bluegill

4. **Hallin Lake**
   Carp, Tench, Brown Bullheads, Pumpkinseed Sunfish, Bluegill, Yellow Perch, Redfin Pickerel, Black Crappie, Largemouth Bass, Walleye, Sculpins

5. **Cow Lake**
   Carp, Tench, Brown Bullheads, Pumpkinseed Sunfish, Bluegill, Yellow Perch, Redfin Pickerel, Black Crappie, Largemouth Bass, Walleye, Sculpins

6. **Finnell Lake**
   Carp, Tench, Pumpkinseed Sunfish, Bluegill, Yellow Perch, Redfin Pickerel, Black Crappie, Brown Bullheads, Largemouth Bass, Walleye, Sculpins

PHYSICAL CHARACTERISTICS OF THE LAKE DURING TREATMENT:

Pre-treatment water quality parameters –

1. **Negro Creek @ Dixon's Ponds - Sample 10/1/2008**

Depth (m)	Water Temp (°C)	Dissolved Oxygen (mg/l)	pH
Surface	11.88	9.00	8.88

2. **Sprague Lake – Sampled 10/8/2007**

Depth (m)	Water Temp (°C)	Dissolved Oxygen (mg/l)	pH
Surface	11.36	11.16	8.95
1	11.35	11.13	8.92
2	11.10	10.66	8.83
3	11.07	10.47	8.83
4	11.10	9.81	8.77

3. **Cow Creek between Sprague and Hallin Lakes – Sampled 10/8/2007**

Depth (m)	Water Temp (°C)	Dissolved Oxygen (mg/l)	pH
Surface	11.45	10.48	8.3

4. **Hallin Lake -Sampled 10/5/2007 – surface only samples were taken because there was no boat access to the lake.**

Depth (m)	Water Temp (°C)	Dissolved Oxygen (mg/l)	pH
Surface	12.04	14.21	8.80

5. **Cow Lake -Sampled 10/5/2007**

Depth (m)	Water Temp (°C)	Dissolved Oxygen (mg/l)	pH
Surface	9.75	10.07	8.95
1	9.65	9.94	8.92
1.6	9.45	9.87	8.83

6. **Finnell Lake -Sampled 10/5/2007 – surface only samples were taken because there was no boat access to the lake.**

Depth (m)	Water Temp (°C)	Dissolved Oxygen (mg/l)	pH
Surface	12.28	9.18	9.04

PRE- AND POST- TREATMENT MONITORING: All monitoring conducted as outlined in WDFW's NPDES permit WA0041009:

Impact to non-targeted organisms – Zooplankton were sampled at Dixon's Ponds, Sprague Lake, Cow Creek, Hallin Lake, Cow Lake, and Finnell Lake for diversity and abundance just previous to treatment, six months post treatment, and will again be sampled 12 months post treatment. Samples are currently being processed, and the results will be available by separate report.

Liquid rotenone formulation longevity – Water samples were taken at Negro Creek, Dixon's Pond, Sprague Lake, Cow Creek, Hallin Lake, Cow Lake, and Finnell Lake 24 hours and four weeks post treatment to check for residues related to the carriers present in the liquid formulation of rotenone. Water samples were taken in areas of the lake where the heaviest concentrations of liquid rotenone were applied. Samples were sent to an accredited lab for analyses per EPA methods. Samples were analyzed for 64 volatile and semi-volatile organic compounds, including benzene, tolulene, phenol, xylene, and derivatives of these compounds, and detection limits were 0.02-3.0 ug/l, variously.

Negro Creek: Water samples were taken at the downstream end of the upper creek, a likely spot for the rotenone and carrier to accumulate. Prenfish had been used to treat these waters. In the 24 hour sample, n-Propylbenzene (1.5 µg/l), 1,3,5-Trimethylbenzene (5.0 µg/l), 1,2,4-Trimethylbenzene (54 µg/l), sec-Butylbenzene (2.3 µg/l), Isopropyltolulene (3.0 µg /l), n-Butylbenzene, (140 µg/l), and Naphthalene (1,900 µg/l) were detected. The amounts of all 57 other compounds possibly present in liquid rotenone formulations were below detection limits in the same sample. In the 4-week sample, the amounts of all 64 compounds possibly present in liquid rotenone formulations were below detection limits.

Dixon's Ponds: Water samples were taken at the launch at mid-lake. Prenfish had been used to treat these waters. In the 24 hour sample, n-Butylbenzene, (1.0 µg /l) and Naphthalene (27 µg /l) were detected. The amounts of all 62 other compounds possibly present in liquid rotenone formulations were below detection limits in the same sample. In the 4-week sample, the amounts of all 64 compounds possibly present in liquid rotenone formulations were below detection limits.

Sprague Lake: Water samples were taken at the 4 Seasons Resort launch at mid-lake where much of the rehab had been staged. Prenfish and Noxfish had been used to treat these waters. In the 24 hour sample, 1,2,4-Trimethylbenzene (3.5 µg /l), n-Butylbenzene, (17 µg /l), and Naphthalene (180 µg /l) were detected. The amounts of all 61 other compounds possibly present in liquid rotenone formulations were below detection limits in the same sample. In the 4-week sample, the amounts of all 64 compounds possibly present in liquid rotenone formulations were below detection limits.

Cow Creek: Water samples were taken at the downstream end of the upper creek and above Hallin Lake, a likely spot for the rotenone and carrier to accumulate. Prenfish and Noxfish had been used to treat these waters. In the 24 hour sample, 1,2,4-Trimethylbenzene (3.2 µg /l), n-Butylbenzene (10 µg /l), and Naphthalene (86 µg /l) were detected. The amounts of all 61 other compounds possibly present in liquid rotenone formulations were below detection limits in the same sample. In the 4-week sample, the amounts of all 64 compounds possibly present in liquid rotenone formulations were below detection limits.

Hallin Lake: Water samples were taken at the lake outlet, a likely spot for the rotenone and carrier to accumulate. Prenfish and Noxfish had been used to treat these waters. In the 24 hour sample, Tolulene (1.1 µg /l) and Naphthalene (110 µg /l) were detected. The amounts of all 62 other compounds possibly present in liquid rotenone formulations were below detection limits in the same sample. In the 4-week sample, the amounts of all 64 compounds possibly present in liquid rotenone formulations were below detection limits.

Cow Lake: Water samples were taken at mid-lake where much of the rehab had been staged. Prenfish and Noxfish had been used to treat these waters. In the 24 hour sample, only Naphthalene (45 µg /l) was detected. The amounts of all 63 other compounds possibly present in liquid rotenone

formulations were below detection limits in the same sample. In the 4-week sample, the amounts of all 64 compounds possibly present in liquid rotenone formulations were below detection limits.

Finnell Lake: Water samples were taken on the east shore, mid-lake. Prenfish and Noxfish had been used to treat these waters. After the first treatment, the first water sample detected n-Butylbenzene (1.4 µg /l) and Naphthalene (55 µg /l). Further treatment of Finnell Lake was required on 8 October, and the 24-hour sample also detected n-Butylbenzene (1.9 µg /l) and Naphthalene (21 µg /l). The amounts of all 61 other compounds possibly present in liquid rotenone formulations were below detection limits in the both samples. In the 4-week sample, the amounts of all 64 compounds possibly present in liquid rotenone formulations were below detection limits.

Period of Toxicity – Persistent rotenone toxicity was determined by bioassay. Live trout were held in a live-bucket (2 gallon volume with free flow-through) in the lakes and survival monitored. All bioassays were begun on November 16, 2008 and buckets were retrieved on November 18, 2008. All bioassays were conducted for 48 hours post exposure to assayed water.

Trout exhibit signs of stress and lose equilibrium after three hours at rotenone concentrations of 0.05 ppm product (0.0025 ppm actual rotenone) at water temperatures of 47° F, and response is fairly uniform among individuals in similar circumstances. Rotenone is considered below detection limits when trout remain alive for at least 48 hours. Individual mortalities within a group of trout frequently occur due to mechanical damage when handled or transported/confined in relatively small containers.

Negro Creek: Bioassay began 43 days post-treatment. Six 3-5 inch rainbow trout were placed in a live bucket just upstream of the Miller's Pond enlargement. No signs of distress were observed after an hour and two hours in the creek. After 48 hours in the creek, no trout had perished. Rotenone toxicity was determined to be below detection limits.

Dixon Pond/enlargement of Negro Creek: Bioassay began 43 days post-treatment. Six 3-5 inch rainbow trout were placed in a live bucket on the east shore. No signs of distress were observed after an hour and two hours in the pond. After 48 hours in the pond, no trout had perished. Rotenone toxicity was determined to be below detection limits.

Cow Creek: Bioassay began 40 days post-treatment. Five 3-5 inch rainbow trout were placed in a live bucket on the Bill Harder ranch driveway crossing. No signs of distress were observed after an hour and two hours in the lake. After 48 hours in the lake, two trout had perished. Rotenone toxicity was determined to be below detection limits, and the mortality of the two trout was determined to be due to other factors (mechanical damage during transport or captivity).

Hallin Lake: Bioassay began 40 days post-treatment. Five 3-5 inch rainbow trout were placed in a live bucket on the south shoreline next to the Cow Creek outlet. No signs of distress were observed after an hour and two hours in the lake. After 48 hours in the lake, no trout had perished. Rotenone toxicity was determined to be below detection limits.

Cow Lake: Bioassay began 40 days post-treatment. Five 3-5 inch rainbow trout were placed in a live bucket on the northwest shoreline of the lake. No signs of distress were observed after an hour and two hours in the lake. After 48 hours in the lake, no trout had perished. Rotenone toxicity was determined to be below detection limits.

Finnell Lake: Bioassay began 42 days post-treatment. Five 3-5 inch rainbow trout were placed in a live-box at the north end of the lake. No signs of distress were observed after a half hour in the lake. After 48 hours in the lake, no trout had perished. Rotenone toxicity was determined to be below detection limits.

Sheep Springs: Bioassay began 40 days post-treatment. Five 3-5 inch rainbow trout were placed in a live-box at the east end of the lake. No signs of distress were observed after a half hour in the lake. After 48 hours in the lake, no trout had perished. Rotenone toxicity was determined to be below detection limits, and the mortality of the one trout was determined to be due to other factors (mechanical damage during transport or captivity).

Sprague Lake: Bioassay began 35 days post-treatment. Five 3-5 inch rainbow trout were placed in live buckets on the east and west shorelines of the lake. No signs of distress were observed after an hour and two hours in the lake. After 48 hours in the lake, no trout had perished in the western end bucket, but one fish had perished in the eastern end bucket. Rotenone toxicity was determined to be below detection limits and the mortality of the one trout was determined to be due to other factors (mechanical damage during transport or captivity).

GENERAL DESCRIPTION OF TREATMENT PROJECT AND OTHER COMMENTS:
A fall treatment for the 2007 treatment of Sprague Lake and the inlet and outlet drainages was chosen primarily to ensure a lack of flow from the system into Lower Cow Creek and eventually the Palouse River. Low water due to summer heat and evaporation at Sprague Lake typically results in minimal or non-existent fall flows. A spring treatment would risk possible heavy winter run-off. However, 2007 was a relatively wet year compared to the previous years, and high lake levels and flows persisted through the fall. There was more water in Negro Creek, outflow from Sprague Lake through Cow Lake and below, and high water in Finnell Lake. Despite these higher than anticipated water levels, all treated flow was successfully contained above Sheep Springs until detoxification occurred.

Most target species should have been finished spawning by mid October and a fall rehab. Lastly, a fall rehab allows for early spring stocking of catchables and a fishery in Sprague Lake, creating a popular year around fishery.

Logistical considerations: The Sprague Lake treatment is the largest lake rehabilitation by rotenone application project done in the state of Washington. The current treatment was only the second time this project has been completed. While the actual treatment was finished within the space of two weeks, many more days were required for equipment preparation and transport, rotenone delivery, signing, and pre/post treatment sampling. Special equipment included one barge purchased for this project and another borrowed from Sherman Creek Hatchery. Powdered rotenone delivery and storage required two semi trailers that were left on site. Treatment required 16 employees on the boats, a shore crew of 4-6 to clean up and dispose of empty containers, and two supervisors to track the application and keep equipment moving. Several extra employees were available to prepare lunches and spell other crew members.

The following treatment description proceeds chronologically and downstream within each section.

3. **Public Access, Type and Condition**: None
4. **Inlet stream:** Cow Creek
5. **Outlet stream:** Cow Creek

Water(s): Dixon's Pond /Negro Creek/ Damage Creek

Location: Lincoln County, Section 21, 22, 23, 24, Township 21 North, Range 38 East; Section 13, 14, 19, 22, 23, 26, 27, 28, 29, 30, Township 21 North, Range 39 East: Damage Creek - Section 12, 13, Township 21 North, Range 39 East

PHYSICAL INFORMATION:

1. **Elevation:** 1,676 ft **Avg/Max Depth:** 26 ft/15 ft **Acres**: 3.8 for Dixon's Pond
   Acre feet: 56 **Weight of water:** 152,216,064 lbs.
2. **Land Ownership:** Public 0% Private 100%
   Land Use: Residential – 0%
   Private-Recreational – 0%
   Grazing – 100%
   Tillable/irrigated - 0%
3. **Public Access, Type and Condition**: None
4. **Inlet stream:** Negro Creek
5. **Outlet stream:** Negro Creek

Habitat Description: Sprague Lake, Cow Lake, Hallin Lake, Finnell Lake and all of the associated tributaries are within the Channeled Scablands region of eastern Washington. Large-scale episodic floods that occurred during the mid to late Pleistocene formed the Channeled Scablands. These floods originated from Lake Missoula, roughly where the City of Missoula exists today. The floods were released from Lake Missoula as large ice dams buoyed up and allowed massive amounts of water to flow out and flood the Columbia Basin, thus making flood channels that flowed into the Columbia River.

These flood channels have widened depressions that fill with water and create lakes. The lakes have highly complex shoreline and bottom formation. This high complexity adds to the fact that these waters are excellent fish habitat. The drainage basins for these waters encompass a large area and drain areas from urban to agricultural. The end result is that the basins are very productive and can grow large numbers of fish rapidly. The geology and land use that these lakes drain allows for the acquisition of large amounts of phosphorous and nitrogen rendering these highly productive.

Included in the drainage area are a number of shallow marshes and swamps that are fed by the lakes and tributaries to the lakes. The marshes and swamps are productive for waterfowl. Additionally, the lake and tributaries to these lakes are oases in the desert providing excellent habitat for terrestrial creatures from river otter to mule deer.

GENERAL MANAGEMENT INFORMATION:

- Current Regulations for Sprague Lake:
  - **Crappie – year-round – Min. size 9 inches. Daily Limit 10.**
  - **Walleye – year-round – Min. size 12 inches. Only 1 over 22 inches may be retained. Daily Limit 8.**
  - **Other game fish – year round – Statewide min. size/daily limit, including:**
  - **Bass – year round – Only bass less than 12 inches except one over 17 inches. Daily Limit 5.**
  - **Channel Catfish – year round – No min. size. Daily Limit 5.**
  - **Trout – year round – No min. size. Daily Limit 5.**

- Stocking: 25,000 to 35,000 catchable rainbow trout annually
  - Channel catfish as available.
- Present fish population: 50 percent walleye, 30 percent carp and tench, and 20 percent rainbow, panfish and catfish (channel and bullhead).
- Anadromous fish use: none.

- Current Regulations for Negro Creek, Damage Creek, Cow Creek, Lugenbeal Creek, Hallin Lake, Cow Lake and Finnell Lake are Statewide Regulations:
  - **Trout – Streams Open June 1 – October 31; Min. size 8"; Daily Limit 2. Lakes open year-round; No min. size; Daily Limit 5.**
  - **Walleye – Min. size 16 inches. Only 1 over 22 inches may be retained. Daily Limit 5.**
  - **Other game fish – Streams Open June 1 – October 31; Lakes open year round – Statewide min. size/daily limit.**

Management History Summary:

During the 19th and early 20th Century Sprague Lake and the associated water bodies were planted with warmwater species, yellow perch, largemouth bass, black crappie, brown bullhead, tench, and carp.

In the 1970's two salmonids species were stocked. Washington Department of Game (WDG) stocked the lake from 1975 to 1978 with Chinook salmon. Not surprisingly, they did not perform well and very few were detected in the creel. However, not to be deterred, WDG stocked 30,500 legal sized (5 fish/pound) rainbow trout in 1977, . The trout showed excellent growth rates, entering the creel at 11 to 13 inches, but by late summer of 1977 these trout were observed in fish kills on Sprague Lake. The fish kills were thought to be caused by parasitic copepods. The lake was considered to be a good fishery for warmwater species during the 1970's, but the fishery steadily declined, until anglers were requesting that WDG investigate the decline of the fishery.

In response to a decline in the recreational fishery, WDG began investigating possible enhancement measures to increase the productivity of the fishery. A creel survey was conducted to evaluate the amount of angler use on the lake. In 1983, only 1,500 angler days were spent on the Sprague Lake fishery. The lack of angler interest in the fishery lead fisheries managers to consider enhancement measures directed at improving angler use. Ultimately, the WDG began developing plans for treating the lake with rotenone.

In 1985, the lake was treated with rotenone and restocked with warmwater fish and trout. The objectives for the 1985 lake rehabilitation were to remove the carp population, establish warmwater fisheries, and to provide 20 years of productive fisheries following the rotenone treatment.

After the rotenone treatment, the lake was stocked with largemouth bass, smallmouth bass, walleye, bluegill, rainbow trout, and Lahontan cutthroat trout. Bullhead catfish, crappie and yellow perch were not intentionally stocked because WDG knew they would wash in from the upper-basin and establish harvestable populations. The rehabilitation was a success and by 1988, a total of 35,000 angler trips annually were expended on Sprague Lake.

Initial angling interest was generated by a robust trout fishery that was intended to provide fishing opportunity until the warmwater populations developed enough to provide a good fishery. The trout fishery lasted for 5 to 6 years, with peak interest and productivity occurring in 1988. Warmwater fish became established well enough to provide desirable populations by 1989. Initial warmwater populations available for harvest were bluegill, bass, walleye and bullhead catfish. Angler use dropped from a high of 55,000 in 1988 trips to approximately 24,000 by 1992.

Warmwater species maintained a popular sport fishery on the lake through the 1990's. However, by the mid 1990's species dominance in the fish population cycled from panfish and bass to walleye. The walleye fishery in conjunction with the remaining panfish fisheries proved to be popular with anglers and maintained angler use at desirable levels. Over time biological sampling indicated that walleye numbers expanded to a point where they were suspected of limiting recruitment of panfish into the sport fishery through predation. By 2000, most of the fish available to harvest were walleye and black crappie. In conjunction with the emergence of walleye dominance in the population, complaints from anglers that fishing was poor continued to build. Spot creel checks indicated that fewer fish were harvested from the lake. Angler groups and the public were issuing comments to the now Washington Department of Fish and Wildlife (WDFW) that the fishery at Sprague Lake was not productive.

To investigate these claims, WDFW conducted several Standardized Warmwater Surveys in the late 1990's and began Fall Walleye Index Netting (FWIN) in October of 2001 to determine the status of the walleye population. Findings indicated that angler reports of limited numbers of fish were inaccurate. To the contrary, the surveys revealed that Sprague Lake had a dense walleye population with a large proportion of harvestable sizes fish. Subsequent FWIN surveys conducted annually through October of 2005 indicated that a harvestable population still existed and was under-exploited by anglers.

Despite large numbers of harvestable walleye in the fish population, Sprague continued to receive limited effort. To document fishery use, WDFW conducted a creel survey in 2006. The creel survey indicated that only 8,700 angler strips were expended on the lake for the year. While this number was not as low as the 1983 creel survey, it was substantially lower than the effort that WDFW believed should be expended on the recreational fishery on Sprague Lake. The target use for the lake was approximately 16,000 angler trips annually, or roughly double the effort that was expended in 2006.

Most other waters in the system have limited fisheries management potential due to frequent low water conditions, vegetation, and limited access. Fish species distributions are directly impacted by the species present in Sprague Lake, and vice viscera. In addition, access to most of the remaining drainage is limited by private land ownership. Cow Lake has the best periodic potential for fisheries management. In 1990, the downstream drainage from the outlet of Sprague Lake to Sheep Springs was rehabilitated to remove carp from the system. The project was intended as much to protect Sprague Lake from burgeoning carp populations as it was to create a fishery in the lower drainage. Initial stocking of Cow Lake with rainbow trout (about 5,000 annually) created a popular fishery for 3-4 years before bass, bluegill, and perch precluded trout survival. The perch fishery was also fairly good for another 3-4 years until carp once again dominated the lake.

Currently, WDFW believes that use of the fishery for the entire Sprague Lake drainage has declined substantially and should be addressed by the application of rotenone and the re-start of the recreational fishery. The anticipated increase in recreational use justifies the project, and will create large economic and recreational benefits for Sprague Lake and the associated waters.

Management Issues Summary:

- Carp and tench left uncontrolled substantially reduce the productivity of all the listed waters. Some type of control of these species is required to maintain productive recreational fisheries and waterfowl habitat.

- Walleye densities in Sprague Lake are high enough to preclude adequate recruitment of panfish and trout to the creel. The productivity of the lake allows for enough recruitment to satisfy current predatory demand, but the remainder of panfish and trout provide for a limited recreational fishery.

- Use by recreational anglers has dropped from a high of 55,000 angler trips in 1988 to 8,700 anglers trips in 2006 at Sprague Lake.

- Drought conditions severely impact the ability to maintain fisheries in the creeks and most of the smaller lakes in this system. In addition, emergent vegetation limits fisheries in Hallin Lake.

Current Management Objectives: Sprague Lake

Fishery Objectives (post rehabilitation):

Year 1

Species	Catch/hour	Catch/angler	Target Size
rainbow trout	.25	2.0	12 inches

Year 2 to 4

Species	Catch/hour	Catch/angler	Target Size
rainbow trout	.50	3.0	14 inches
Lahontan cutthroat	.10	1.5	16 inches

Year 5 to 10

Species	Catch/hour	Catch/angler	Target Size
rainbow trout	.25	2.0	16 inches
panfish*	1	5	7 to 12 inches
largemouth bass	.25	2.5	13 inches
Brown bullhead and Channel Catfish	.5	1	bullhead -12 inches channel – 20 inches

* panfish includes an aggregate of bluegill, black crappie, white crappie and yellow perch

Angler use objective, angler days/surface acre/ year (AD/SA/YR): Sprague Lake

Year	AD/SA/YR
1	6
2	8
3	12
4	12
5	10
6	10
7	10
8-20	8

Angler use objective, angler days/surface acre/ year (AD/SA/YR): Cow Lake

Year	AD/SA/YR
1	2
2	2
3	4
4	4
5	4
6	3
7	3
8-20	3

Stocking Objectives: Sprague Lake

Post rehabilitation, Year 1

Species	Size class	Number	Fish per acre
bluegill	adult	1,000	.53
bluegill	yearling	15,000	8.07
black crappie	adult	1,000	.53
black crappie	yearling	15,000	8.07
white crappie	adult	1,000	.53
largemouth bass	adult	300	.16
largemouth bass	sub-adult	2,000	1.08
largemouth bass	yearling	10,000	5.38
channel catfish	yearling	10,000	5.4
rainbow trout	catchable	100,000	54
rainbow trout	fry-spring	200,000	108

Post rehabilitation, Year 2

Species	Size class	Number	Fish per acre
rainbow trout	catchable	50,000	27
rainbow trout	fry-spring	300,000	161
Lahontan cutthroat trout	fry-fall	100,000	54

Post rehabilitation, Year 3*

Species	Size class	Number	Fish per acre
rainbow trout	catchable	50,000	27
rainbow trout	fry-spring	200,000	108
Lahontan cutthroat trout	fry-fall	100,000	54

*Year 3, warmwater species may be stocked if populations are not developing as expected

Post rehabilitation, Year 4*

Species	Size class	Number	Fish per acre
rainbow trout	catchable	50,000	27
rainbow trout	fry-spring	200,000	108
Lahontan cutthroat trout	fry-fall	100,000	54
tiger musky**	yearling	900	.48
white sturgeon**	yearling	25	

*Year 4, warmwater species may be stocked if populations are not developing as expected

**Tiger musky and white sturgeon may not be stocked this proposal is still under review. Post rehabilitation.

Year 6 to10*

Species	Size class	Number	Fish per acre
rainbow trout	catchable	50,000	27

Stocking Objectives: Cow Lake

Year 1 to 5

Species	Size class	Number	Fish per acre
rainbow trout	Fry-spring	35000	145
rainbow trout	catchable	5,000	20

4. Management Strategy (including regulations): Sprague Lake

- Regulations post-rehab: Sprague Lake
  - **Trout – year round - No min. size. Daily limit 5. Up to 2 over 20 inches.**
  - **Largemouth bass – year round –** – Only bass less than 12 inches except one over 17 inches. Daily Limit 5
  - **Crappie – year round – min. size 9 inches. Up to 25 BLUEGILL and CRAPPIE combined.**
  - **Bluegill – year round – No min. size. Up to 25 BLUEGILL and CRAPPIE combined.**
  - **Other game fish – year-round - Statewide min. size/daily limit.**
- Regulations post-rehab: Hallin Lake, Cow Lake, Finnell Lake, Damage Creek, Negro Creek, Cow Creek.
  - **Maintain current and statewide regulations for these bodies of water.**
- Plant rainbow fry and/or catchables in Sprague Lake and Cow Lake during spring 2008 and for subsequent years to function as an interim fishery until the warmwater populations establish well enough to support a viable recreational fishery or preclude trout survival.

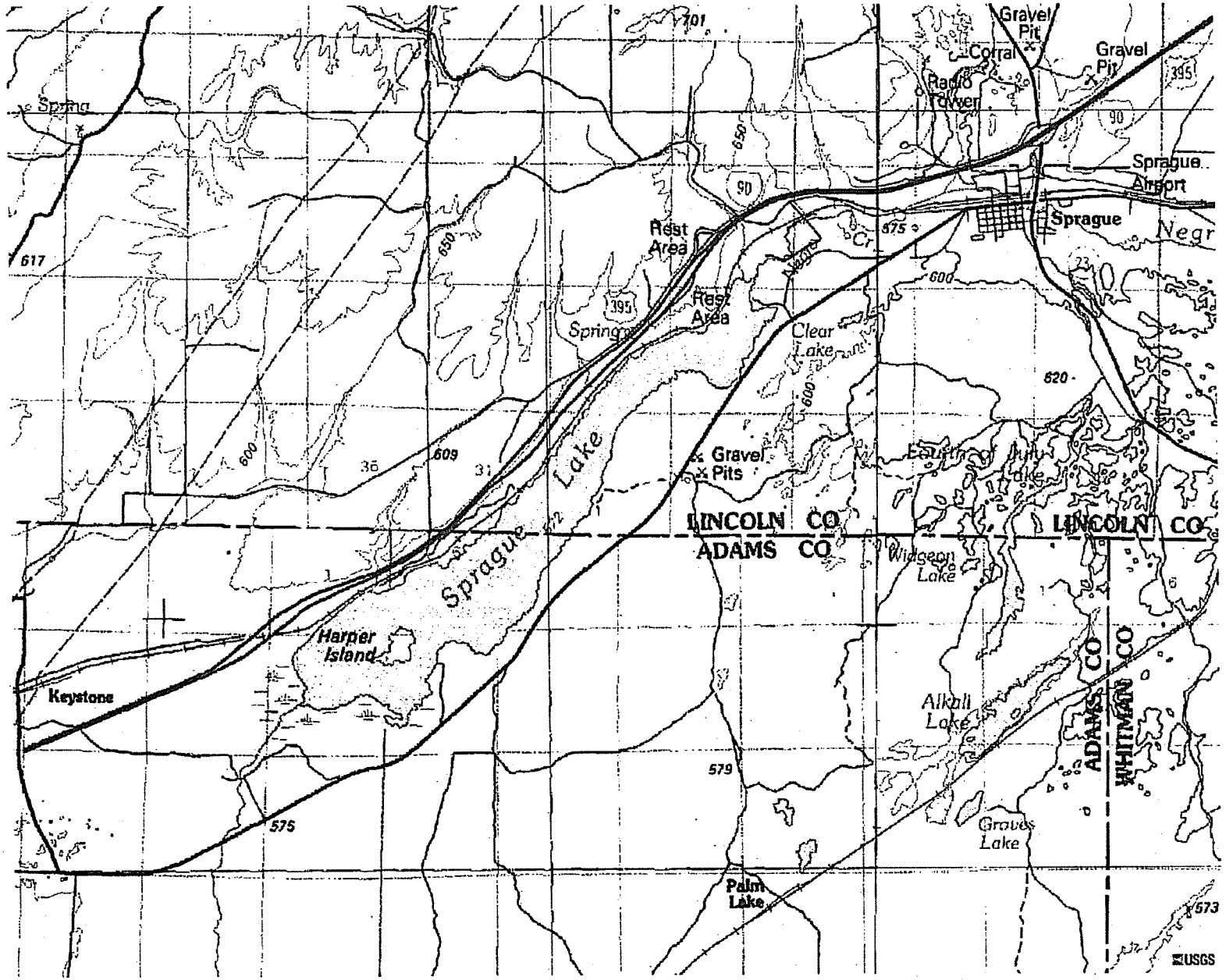
- Plant warmwater species in Sprague Lake to establish the desired recreational fishery, with initial stocking commencing during spring 2008. Additional stocking to develop the desired species composition and abundance may be done at later dates. Warmwater species are expected to re-populate Hallin Lake, Cow Lake, Finnell Lake and connecting streams without WDFW stocking efforts.

- Monitor Sprague Lake fishery with the 2006 Sprague Lake creel survey protocol post rehab at least Year 3, Year 7, Year 11, and Year 15.

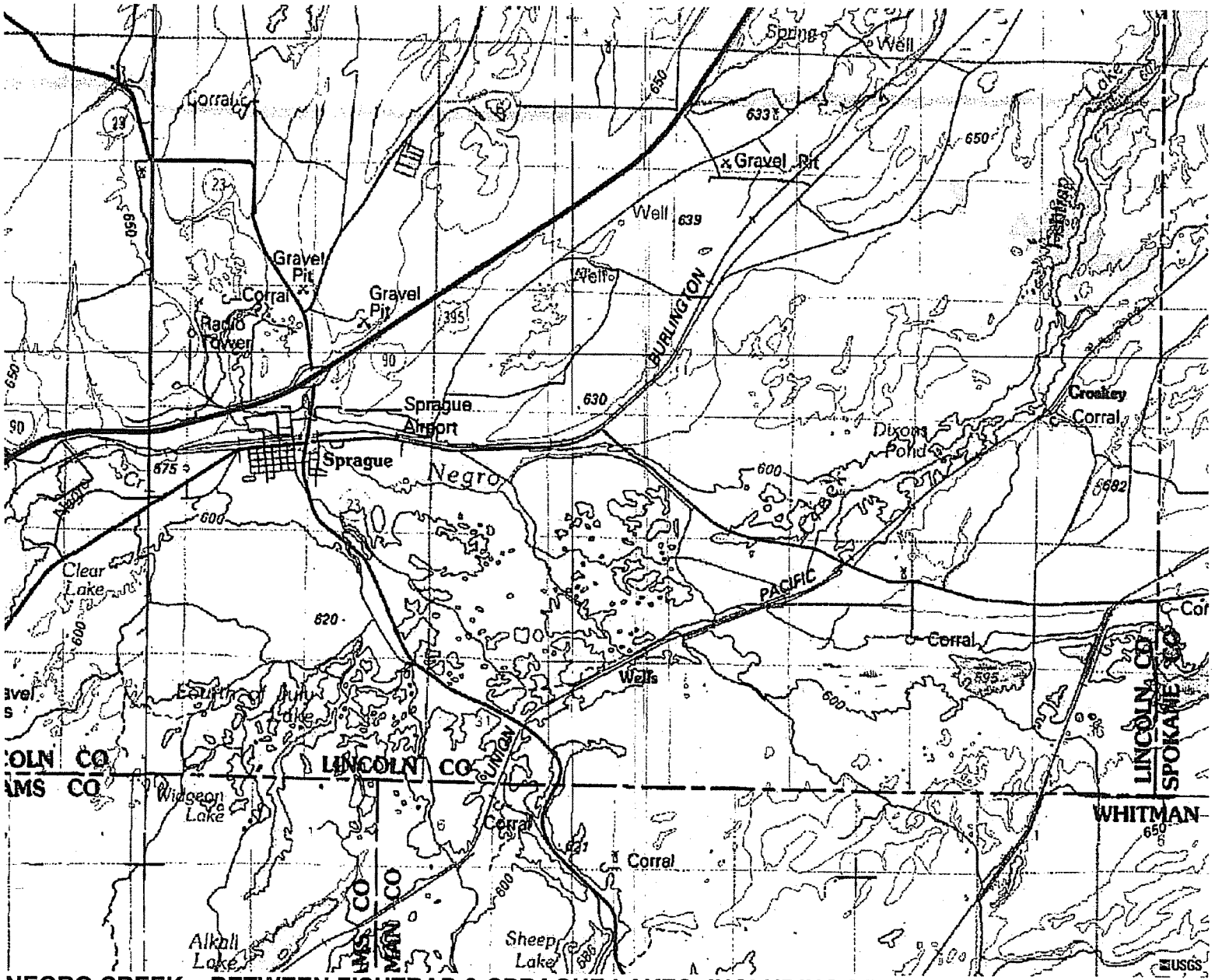
- Monitor all fish species periodically by using standardized warmwater assessment protocol and Region 1/3 and Region 2 Warmwater Assessment Teams.

- Use biological surveys and creel to monitor population status and recreational use. Recreational use should be commensurate with the target use of 8 AD/SA/YR. If use decreases below desired target, management actions will be taken to increase recreational fishery use and productivity.

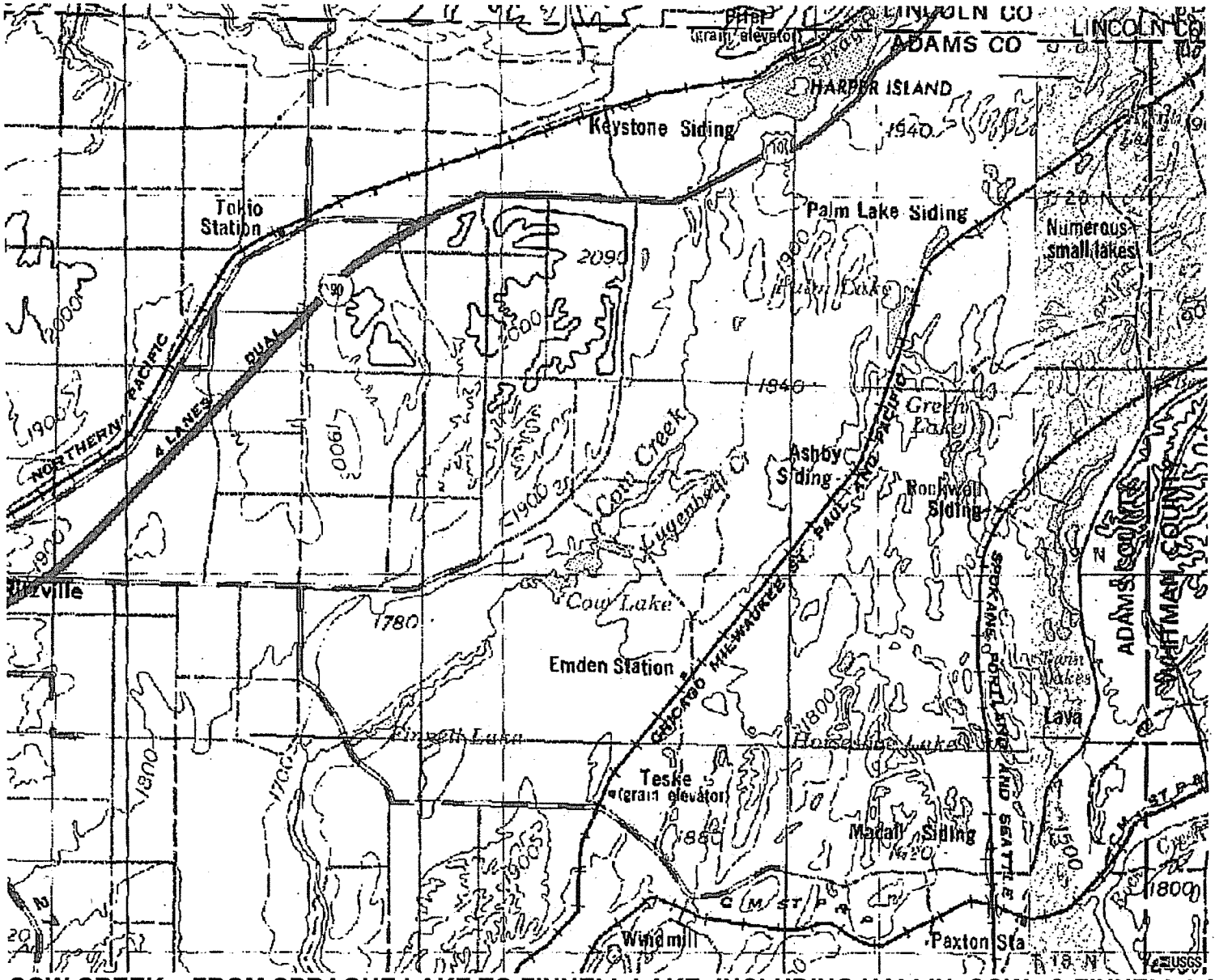
- Native Species/Stocks/Habitats Needing Special Protection: None.



SPRAGUE LAKE



NEGRO CREEK – BETWEEN FISHTRAP & SPRAGUE LAKES; INCLUDING DIXONS POND AND DAMAGE CREEK



COW CREEK – FROM SPRAGUE LAKE TO FINNELL LAKE; INCLUDING HALLIN, COW, & FINNELL LAKES, LUGENBEAL CREEK, AND SHEEP SPRINGS

PRE-REHABILITATION PLAN

Sprague Lake

I. PROPOSAL

A. Justification for Proposed Rehabilitation

Description of Resource Area

Sprague Lake is 1,860 surface acres, and is 1 mile south of the City of Sprague. The Sprague Lake fishery supports two resorts, Four Seasons Campground and Sprague Lake Resort. The lake is used for recreational angling, wildlife watching, water sports, and as water storage for irrigation.

Background Information

Sprague Lake has a long history of providing a fishery to residents and visitors from around the region. Sprague Lake was originally stocked with warmwater fishes in the 1890s. Exact numbers and species are not known, but it was common practice by the U.S. Fish Commission to stock multiple fish species into lakes such as Sprague. Species likely stocked included bass, crappie, bluegill, bullhead catfish, tench and common carp.

The magnitude of historical use by anglers is not well understood, but the lake had a reputation for yielding good catches of crappie, bass, catfish and common carp. Up to the early 1980s a commercial fishery for common carp was conducted on the lake, but a reduced market demand eventually rendered the commercial fishing valueless. By the late 1970s, the fish population of Sprague Lake was dominated by common carp. The common carp population was dense and stunted, and offered little value to recreational anglers.

In response to a decline in the recreational fishery, the Washington Department of Game (WDG) began investigating possible enhancement measures to increase the productivity of the fishery. A creel survey was conducted to evaluate the amount of angler use on the lake. In 1983, only 1,500 angler days were spent on the Sprague Lake fishery. The lack of angler interest in the fishery lead fisheries managers to consider enhancement measures directed at improving angler use. Ultimately, the WDG developed plans for treating the lake with rotenone.

In 1985, the lake was treated with rotenone and restocked with warmwater fish and trout. The objectives for the 1985 lake rehabilitation were to remove the carp population, establish warmwater fisheries, and to provide productive fisheries following the rotenone treatment.

After the rotenone treatment, the lake was stocked with largemouth bass, smallmouth bass, walleye, bluegill, rainbow trout and Lahontan cutthroat trout. Bullhead catfish, crappie and yellow perch were not intentionally stocked because WDG knew they would wash in from the upper-basin and establish harvestable populations. The rehabilitation was a success and by 1988, a total of 35,000 angler trips annually were expended on Sprague Lake.

Initial angling interest was generated by a robust trout fishery that was intended to provide fishing opportunity until the warmwater populations developed enough to provide a good fishery. The trout fishery lasted for 5 to 6 years, with peak interest and productivity occurring in 1988. Warmwater fish became established well enough to provide desirable populations by 1989. Initial warmwater populations available for harvest were bluegill, bass, walleye and bullhead catfish. Angler use dropped from a high of 55,000 in 1988 trips to approximately 24,000 by 1992.

Warmwater species maintained a popular sport fishery on the lake through the 1990s. However, by the mid 1990s species dominance in the fish population cycled from panfish and bass to walleye. The walleye fishery proved to be popular with anglers and maintained angler use at desirable levels. Over time, biological sampling indicated that walleye numbers expanded to a point where they were suspected of limiting recruitment of panfish into the sport fishery through predation. By 2000, most of the fish available to harvest were walleye, and black crappie. In conjunction with the emergence of walleye dominance in the population, complaints from anglers that fishing was poor continued to build. Spot creel checks indicated that fewer fish were harvested from the lake. Angler groups and the public were issuing comments to WDFW that the fishery at Sprague Lake was not productive.

To investigate these claims, WDFW conducted several Standardized Warmwater Surveys in the late 1990s and began Fall Walleye Index Netting (FWIN in October of 2001 the) to determine the status of the walleye population. Findings indicated that angler reports of limited numbers of fish were inaccurate. To the contrary, the surveys revealed that Sprague Lake had a dense walleye population with a large proportion of harvestable sized fish. Subsequent FWIN surveys conducted annually through October of 2005 indicated that a harvestable population still existed and was under-exploited by anglers.

Despite large numbers of harvestable walleye in the fish population, Sprague continues to be a fishery that receives limited effort. To document fishery use, WDFW conducted a creel survey in 2006. The creel survey indicated that only 8,700 angler strips were expended on the lake for the year. While this number isn't as low as the 1983 creel survey, it is substantially lower than the use that WDFW believes should be supported by the recreational fishery on Sprague Lake. The target use for the lake is approximately 16,000 angler trips annually or roughly double the effort that was expended in 2006.

In conclusion, WDFW believes that use of the fishery has declined substantially and should be addressed by the application of rotenone and the re-start of the recreational fishery. The anticipated increase in recreational use justifies the project, and will create large economic and recreational benefits for Sprague Lake and the associated waters.

Management Options

The apparent lack of angler utilization has lead to requests for WDFW to change management practices. In response to these requests, WDFW developed five potential options for enhancing the fishery:

1. Increase the harvest of walleye through adjusted regulations.
2. Increase the trout-stocking program.
3. Enhance habitat to increase juvenile panfish recruitment and reduce predation
4. Mechanical removal of problem fish species
5. Repeat the 1985 lake rehab and re-establish balanced warmwater fish populations and provide an interim trout fishery

Option 1: Increase the harvest of walleye through adjusted regulations.

WDFW has addressed this alternative and developed a regulation for Sprague Lake that was implemented May 1, 2006.

The new regulation sets the minimum size at 12 inches, daily limit 8, with no more than 1 over 22 inches.

The regulation change allowed for the anglers to harvest 3 more fish daily, and reduced the minimum size from 16 to 12 inches. This change allowed for 75 percent of the walleye in the lake to be available to angler harvest. WDFW believed this regulation should have increased harvest on walleye, if angler participation increased. To determine if angler participation increased due to the regulation change, and whether exploitation might shape the walleye population, a 16-month creel survey was implemented to monitor the fishery and was completed in the June of 2007.

The 2006 portion of the creel survey indicated that harvest for walleye was very low. The harvest for the 2006 open water fishery was estimated at 2,285 walleye greater than 12 inches in length. Using the Fall Walleye Index Netting data for a rough estimate of population, a population exploitation rate can be determined.

The formula for the rough population estimate = surface acreage/hectare conversion X geometric mean of fish per net. Using the following values,

Surface acreage = 1,860 surface acres
Hectare conversion = 2.47
Geometric mean fish per net for Sprague Lake =35

1,860/2.47*35 = 26,356 walleye were present in Sprague Lake.

The total harvest for the fishery was 2,285 walleye. Dividing the total harvest by the population estimate will yield the population exploitation rate:

Population Exploitation = 2,285/26,356 = 0.0866 or 8.66 percent.

The anglers on Sprague Lake are only harvest approximately 8.66 percent; this amount of harvest will not substantially change the current walleye population in the lake. To modify a walleye population with angler harvest, a minimum of 30 percent of the standing crop must be harvested annually. Thus, the regulation change and angler exploitation was not a tool that sufficiently altered the fish population in Sprague Lake and the issues that accompanied a predator heavy fish population.

Estimated cost for option 1: $125,000 for 16-month creel survey

Option 2: Increase trout stocking program.

2A: The intent of the 1985 rotenone treatment was to phase-out trout stocking. However, the trout program proved to be highly productive and popular with anglers. In response to this success, WDFW continued to stock trout. Currently, 25,000 to 35,000 catchable-sized rainbow trout are stocked annually in the lake. The cost associated with stocking large trout precludes WDFW from stocking enough fish to maintain the original trout fishery as seen following the 1985 rotenone project. To create a trout fishery similar in number and catch rates to 1985 to 1989, WDFW would have to stock approximately 90,000 trout at a minimum size of 12 inches per fish annually. Larger trout would increase survival and reduce predation by walleye. WDFW does not have the space or water in their hatchery facilities to produce the required amount of fish. Fish to be stocked in Sprague Lake would have to be purchased from private vendors.

Estimated annual cost to implement option 2A: 90,000 one pound fish purchased at $1.20 per fish= $108,000

2B: Use net pens to rear trout and release trout into Sprague Lake.Net pens have worked in many lakes in eastern Washington. The theory behind rearing fish in net pens is that raising them to a larger size will increase survival. There are some issues with using net pens in Sprague Lake that may limit this option's success. First, the fish must be raised over winter in the nets. Because Sprague Lake freezes and has a highly mobile ice pack, it would be difficult to maintain the net pens. During most winters, the net pens would be destroyed by mobile ice. Second, all successful net pen programs rely on volunteer labor to complete the maintenance and feeding. Most volunteer groups rely on large numbers of individuals to complete the work (approximately 600 – 750 hrs per project). There may not be enough willing individuals in the Sprague Lake area to complete the tasks. Third, net pens need to be placed in water at a minimum of 15 feet deep. Water that deep does not exist along the shorelines of Sprague lake. Therefore the net pens would have to be anchored in the middle of the lake. This requires more volunteers to maintain, and increases the nets pens' susceptibility to damage from the winter mobile ice pack. The likelihood of annual trout stocking success on Sprague Lake using net pens is not good.

Estimated cost to implement option 2B:
Start up - 4 net pens at $14,000 each = $56,000
Annual – 100,000 fall fry rainbow trout @ $.40 per fish, fish feed $3,500, pen maintenance $10,000 =$53,500

Option 3: Enhance habitat to increase fish recruitment and reduce predation.

Juvenile fish use complex habitat to avoid predation. It is assumed that if increased numbers of juvenile trout and panfish could avoid predation, they would ultimately recruit to the fishery as adults. Adding habitat also only works if the available habitat has been saturated. Sprague Lake is not known to be lacking in complex habitat, and the amount has been sufficient in the past to protect prey species.

The amount of habitat available to fish could always be increased. Christmas trees, orchard cuttings or synthetic structures could be added to increase habitat complexity. The general rule of thumb for increasing complexity enough to positively influence fish populations is that enough habitat needs to be added to the lake to cover approximately 30 percent of the surface acreage. This equates to adding up to 558 acres of complex habitat to Sprague Lake. Adding habitat once will not be successful. Habitat structures will have to be maintained to replace that habitat that has worn out or lost its effectiveness. Supplementing complex habitat is an annual and long-term project.

Estimated cost to implement Option 3 :
Start Up - $2000 per acre, 558 acres=$1,116,000.
Annual cost following full implementation= $20,000.

Option 4: Mechanical removal of problem fish species

There are many case studies in which fish population structures have been favorably modified by using mechanical removal techniques to reduce population densities of unwanted fish species. Most of these mechanical removal projects have been done in scenarios involving smaller lakes or less productive fish species than carp, tench or walleye. This type of management option could be applied to Sprague Lake to reduce the density of walleye so that prey species could recruit at higher levels, but it is likely that the compensatory response from carp and tench would lead to those species filling the void following the removal of the problem walleye. Solving one problem would lead to another that is just as damaging to the recreational fishery. This option would have to be implemented annually to keep control of the unwanted fish populations. Annual implementation would be costly and time consuming, and would likely have to be combined with several other options to produce a better recreational fishery. Mechanical removal does not appear to be a good fishery management option for Sprague Lake.

Estimated cost to implement Option 4:
Start up - $20,000 for equipment
Cost for full one year implementation= $220,000
Annual cost to keep population reduced = $75,000

Option 5: Implement a lake rehabilitation plan similar to the 1985 lake rehabilitation, and re-establish balanced warmwater fish populations and provide an interim trout fishery.

Initiate and implement a lake rehabilitation plan using similar strategies to those employed in 1985. The only difference would be not stocking walleye, or using only triploid walleye to avoid the predation issues currently affecting the fish populations of Sprague Lake.
This option would re-start fish populations, and would likely result in the immediate return of angler interest to Sprague Lake. This type of project is initially costly but is very cost effective over the long term (probably 20 years).

Estimated cost to implement option 5 is:
Lake rehabilitation including rotenone, equipment and personnel – $379,380
Initial Fish stocking – $68,000
Annual fish stocking – $25,000

B. Physical Description of Water Proposed for Rehabilitation

1. WATER**: Sprague Lake**
2. LOCATION: Adams County/Lincoln County
Section 1, 12, Township 20 North, Range 37 East; Section 5, 6, 7, Township 20 North, Range 38 East; Section 21, 28, 29, 31, 32, Township 21 North, Range 38 East
3. SURFACE ACRES: 1,860
4. MAX. DEPTH: 20 ft MEAN DEPTH: 11ft
5. VOLUME: 19,650 acre feet, 53,411,529,600 lbs. of water
6. INLET: FLOW (cfs) **Negro Creek** from outlet of Fishtrap through Dixon's Pond to Sprague Lake is intermittent in portions. The flowing portions will have 1 to 1.5 cfs during time of treatment. There are approximately 11 miles of potentially treatable stream. A large portion of this will probably be dry.
7. OUTLET: Cow Creek
   FLOW (cfs) The outlet to Sprague Lake is intermittent. The outlet will probably be dry by the first week in October.
8. PUBLIC ACCESS: One WDFW owned access site
9. LAND OWNERSHIP: Public 3% Private 97%;
10. ESTABLISHED RESORTS: 2 resorts with camping and launching facilities.

1. WATER: **Cow Lake**
2. LOCATION: Adams County, Section 16, 20, 21, Township 19 North, Range 37 East
3. SURFACE ACRES: 240 226
4. MAX. DEPTH: 21 ft MEAN DEPTH: 6 ft
5.VOLUME: 1,300 acre feet, 3,533,587,200 lbs. of water
6. INLET: from Hallin Lake, approximately 300 yards of channel – expected to be dry during treatment period. FLOW (cfs) If flowing, less than 1cfs
7.OUTLET: Cow Creek
   FLOW (cfs) outlet is intermittent, expected to be dry during treatment
8. PUBLIC ACCESS: Undeveloped Washington Department of Natural Resources owned access
9. LAND OWNERSHIP: Public 1% Private 99%
10. ESTABLISHED RESORTS: None

1. WATER: **Hallin Lake**
2. LOCATION: Adams County, Section 15, 16, Township 19 North, Range 37 East
3. SURFACE ACRES: 33
4. MAX. DEPTH: 14 ft MEAN DEPTH : 2ft
5. VOLUME: 70 acre feet, 190,270,080 lbs.of water
6. INLET: Cow Creek (including Lugenbeal Springs flows)
7. OUTLET: Cow creek to Cow Lake approximately 300 yards of channel – expected to be dry during treatment period
   FLOW (cfs) If flowing,less than 1cfs
8. PUBLIC ACCESS: Undeveloped Washington Department of Natural Resources owned access
9. LAND OWNERSHIP: Public 5% Private 95%
10. ESTABLISHED RESORTS: None

1. WATER: **Finnell Lake including Sheep Springs**
2. LOCATION: Adams County, Section 36, Township 19 North, Range 36 East, Section 2, Township 18 North, Range 36 East, this takes in the Sheep Springs Dam
3. SURFACE ACRES: 31
4. MAX. DEPTH: 13ft MEAN DEPTH: 6ft
5. VOLUME: 186 acre feet, 60,608,100 505,574,784 lbs. of water
6. INLET: Cow Creek from Cow Lake; intermittent, expected to be dry.
7. OUTLET:
   FLOW (cfs) less than 1 cfs or possibly dry - no toxic water will be allowed to go below Sheep Springs Dam.
8. PUBLIC ACCESS: None
9. LAND OWNERSHIP: Public 0% Private 100%
10. ESTABLISHED RESORTS: None

1. WATER: **Dixons Pond /Negro Creek/ Damage Creek**
2. LOCATION: Lincoln County, Section 21, 22, 23, 24, Township 21 North, Range 38 East; Section 13, 14, 19, 22, 23, 26, 27, 28, 29, 30, Township 21 North, Range 39 East: Damage Creek - Section 12, 13, Township 21 North, Range 39 East
3. SURFACE ACRES: Dixon'sPond – 3.8
4. MAX. DEPTH: Dixon's Pond – 26ft MEAN DEPTH: Dixon's Pond 15ft
5. VOLUME: Dixon's Pond – 56 acre feet, 152,216,064lbs. of water
6. OUTLET:
   FLOW (cfs) **Negro Creek** from outlet of Fishtrap through Dixon's Pond to Sprague Lake is intermittent in portions. The flowing portions will have 1 to 1.5 cfs during time of treatment. There are approximately 11 miles of potentially treatable stream. A large portion of this will be dry. **Damage Creek** will be dry during time of treatment.
7. PUBLIC ACCESS: None
8. LAND OWNERSHIP: Public 0% Private 100%
9. ESTABLISHED RESORTS: None

1. WATER: **Cow Creek between Sprague Lake and Hallin Lake**
2. LOCATION: Adams County, Section 11, 12, 14, 23, 26, 35, Township 20 North, Range 37 East, Section 2, 10, 11, 15, 16, 20 Township 19 North, Range 37 East
3. SURFACE ACRES: NA
4. MAX. DEPTH: NA
5. VOLUME: Volume is expected to be less than 1.5 cfs
6. OUTLET:
   FLOW (cfs)– flow is intermittent between Sprague Lake and Cow Lake. Cow Creek disappears and re-emerges in several spots along the 6 mile stretch between the lakes. The outlet from Sprague Lake will be dry during the time of treatment. The Creek

reemerges approximately 1 mile below Sprague Lake and will be treated in the areas where it runs above ground.
7. PUBLIC ACCESS: None
8. LAND OWNERSHIP: Public 0% Private 100%
9. ESTABLISHED RESORTS: None

1. WATER: **Lugenbeal Springs**
2. LOCATION: Adams County, Section 1, 11, 12, 14, 15, Township 19 North, Range 37 East, if treated further downstream, include: Section 29, 30, 31 Township 19 North, Range 37 East, Section 35, 36, Township 19 North, Range 36 East
3. SURFACE ACRES: 5
4. MAX. DEPTH: 10ft
5. VOLUME: OUTLET: FLOW (cfs) volume is expected to be less than 1 cfs
8. PUBLIC ACCESS: None
9. LAND OWNERSHIP: Public 0% Private 100%
10. ESTABLISHED RESORTS: None

C. Proposed Management Actions

1. WATER: **Sprague Lake**
2. TARGET SPECIES: common carp, tench, walleye
3. DATE LAST REHABED: Oct 3, 1985
4. PROPOSED TREATMENT DATE: September - November 2007
5. REPLANTING DATE: Spring 2008.
6. SPECIES: rainbow trout, Lahontan cutthroat, largemouth bass, bluegill, black crappie, white crappie, channel catfish, tiger musky
7. STOCKING: approximately 500,000 fish total
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 2 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): **105,930 lbs powder and, 396 gallons liquid**

1. WATER: **Cow Lake**
2. TARGET SPECIES: common carp, tench, walleye
3. 3. DATE LAST REHABED: Oct 31, 1990
Cow Creek was rehabilitated from Sprague Lake to Sheep Springs, including Hallin, Cow, and Finnell lakes and the tributary Lugenbeal Creek, during late October and November 1990. Over 225 acres of surface water and 20 miles of creek were treated with 10,400 lbs. of powdered rotenone (6.8%) and 250 gallons of liquid rotenone (5.0%). Eastern Washington had endured drought conditions for most of the previous three years. Cow Creek appeared only intermittently and lake levels were very low. Much less water needed to be treated than in other attempts, and enough rotenone was available for increased concentrations. (Korth report 18 Dec 1991)
4. PROPOSED TREATMENT DATE: September - November 2007
5. REPLANTING DATE: Spring 2008.
6. SPECIES: rainbow trout
7. STOCKING: approximately 35,000 rainbow trout spring fry
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 3ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): **7850 lbs and 210 gallons, liquid applied by helicopter or 10,512 lbs powder only**

1. WATER: **Hallin Lake**
2. TARGET SPECIES: common carp, tench, walleye
3. DATE LAST REHABED: October 26, 1990

4. PROPOSED TREATMENT DATE: September - November 2007
5. REPLANTING DATE: none
6. SPECIES: none
7. STOCKING: none
8. PROPOSED TOXICANT: Rotenone liquid CONCENTRATION: 3ppm AMOUNT (ROTENONE AT 5% ACT. INGRED): **566 lbs powder or 69 gallons of liquid applied by helicopter**

1. WATER: **Finnell Lake including Sheep Springs**
2. TARGET SPECIES: common carp, tench, walleye
3. DATE LAST REHABED: October 25, 1990
4. PROPOSED TREATMENT DATE: September - November 2007
5. REPLANTING DATE: none
6. SPECIES: none
7. STOCKING: none
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 3ppm AMOUNT (ROTENONE AT 5% ACT. INGRED): **Powder 1,504 lbs – if water is too low the prescription will be altered to liquid rotenone 184 gallons to be applied by helicopter.**

1. WATER: **Dixon's Pond /Negro Creek/ Damage Creek**
2. TARGET SPECIES: common carp, tench, walleye
3. DATE LAST REHABED: Oct 3, 1985
4. PROPOSED TREATMENT DATE: September - November 2007
5. REPLANTING DATE: none
6. SPECIES: none
7. STOCKING: none
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 3ppm AMOUNT (ROTENONE AT 5% ACT. INGRED): **Powder 400 452 lbs and Liquid 10 gallons** – liquid to be used on Negro Creek and adjacent marsh. Accurate amounts to be applied to achieve prescribed concentrations will be determined based on stream flow within 2 weeks prior to treatment.

1. WATER: **Cow Creek between Sprague Lake and Hallin Lake**
2. TARGET SPECIES: common carp, tench, walleye
3. DATE LAST REHABED: October 25 – November 2, 1990
4. PROPOSED TREATMENT DATE: September - November 2007
5. REPLANTING DATE: none
6. SPECIES: none
7. STOCKING: none
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 3ppm - AMOUNT (ROTENONE AT 5% ACT. INGRED): **Liquid 20 gallons** - Accurate amounts to be applied to achieve prescribed concentrations will be determined based on stream flow within 2 weeks prior to treatment.

1. WATER: **Lugenbeal Springs**
2. TARGET SPECIES: common carp, tench, walleye
3. DATE LAST REHABED: October 25 – November 2, 1990
4. PROPOSED TREATMENT DATE: September - November 2007
5. REPLANTING DATE: none
6. SPECIES: none
7. STOCKING: none
8. PROPOSED TOXICANT: Rotenone, powder (sand mixture) and liquid

CONCENTRATION: 3ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): **Liquid 15 gallons and Sand Mixture 20 lbs** – Accurate amounts to be applied to achieve prescribed concentrations will be determined based on stream flow within 2 weeks prior to treatment.

METHOD OF APPLICATION: For all bodies of water listed above one or more of these methods of application will be employed: pumper boats - slurry and spray; ATV with sprayer; small boat with small sprayer; canoe with small sprayer; backpack sprayers; hand spreading of sand mixture; aerial- helicopter.

Sand mixture is a new technique to be applied during this treatment. The sand mixture is made by mixing fine sand, gelatin and rotenone powder. The sand mixture is dropped into the spring areas and it slowly dissolves into the water. This will prevent the springs from rapidly purging the rotenone and allowing for refuges where fish can escape exposure to the rotenone.

DETOXIFICATION PLAN

The rehabilitation project is to be implemented to upstream of Sheep Springs Dam. In the event that flow is passing over Sheep Springs Dam and downstream into Cow Creek, potassium permanganate ($KmnO_4$) will be applied to the water to oxidize the remaining rotenone to prevent a fish kill downstream of Sheep Springs Dam.

24 hours prior to rotenone distribution flows will be measured and preparations for detoxification will be started. Appropriate amounts of 2.5 percent $KmnO_4$ solution will be prepared for distribution into Cow Creek.

On the day of rotenone distribution the detoxification station will be started one hour prior to the distribution of rotenone. A vessel holding up to 100 gallons of 2.5 percent $KmnO_4$ solution will be placed streamside and will drip (drip will be controlled by a volume control valve) the required volume of $KmnO_4$ solution into the water (Table 1). Flow rates will be checked hourly using a graduated cylinder to maintain proper concentration rates.

Bio-assay fish (rainbow trout in live cages) will be placed directly above Sheep Springs Dam, a half-hour flow time below the detoxification station and 1 hour flow time below the detoxification station. These fish will be monitored daily and detoxification will not be suspended until fish in the cages live for 48 hours post exposure to Cow Creek.

Table 1 – Table includes required weight of pure $KMnO_4$ and 2.5 percent $KMnO_4$ solution. Weight and concentration are based on cubic feet per second flows (cfs).

cfs	grams $KMnO_4$/min	ml/min of solution	pounds $KMnO_4$ /24 hours	gallons of solution/24 hours	pounds $KMnO_4$/14 days	gallons of solution/14 days
0.5	2.55	105	8.08	2.14	113.0976	560
1	5.10	210	16.16	4.27	226.1952	1120
1.5	7.65	315	24.24	6.41	339.2928	1680
2	10.20	420	32.31	8.55	452.3904	2240
2.5	12.75	525	40.39	10.69	565.488	2800

The duration for detoxification will be until rotenone toxicity is proved by bio-assay to have

been eliminated from water flowing down Cow Creek. A minimum of 14 days of detoxification is the expected duration.

Staff will be present for 24 hours a day, during detoxification period, to monitor the detoxification station, and bio-assay fish.

The need for detoxification will be decided by the third week in September, if flows exists at that time the project will proceed with preparations to detoxify Cow Creek below Sheep Springs Dam downstream.

CREW DESCRIPTION:

October 1-6: Leader(s) : Chris Donley, Jeff Korth Personnel; 6 to 8
Ocotber 8-12: Leader(s) : Chris Donley, Jeff Korth Personnel; 35

II. PURPOSE:

Sprague Lake has been managed as a warmwater/trout fishery since 1985. The success of the 1985 rotenone treatment would indicate that a repeat of that project would increase the productivity of the recreational fishery. A complete rehabilitation of the Sprague Lake system is the most cost effective and potentially successful plan. The current fish population is not generating angler participation; the intent is to create a panfish/ largemouth bass with a secondary trout fishery that is attractive to recreational anglers.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

WDFW intends to restore Sprague Lake to a productive recreational fishery. In 2006, angler use of the fishery was 4.7 angler days per surface acre per year (AD/SA/YR). The goal of the project is to increase angler participation to a minimum of 8 AD/SA/YR over the life of the project. The intended life of the project is 20 years.

IV. RESOURCE IMPACTS:

1. Target species: common carp, tench and walleye

2. District and Regional Habitat, Wildlife and Non-Game biologists have been apprised of our rehabilitation plans. No objections were raised, and only cautionary concerns were expressed on the potential impacts to non-targeted species.

According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of the population average 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so.

3. Participation in the fishery should exceed that currently found for existing fisheries. The water in the lake is used for both irrigation and recreation. Dead fish along the shoreline may be offensive to the property owners for a short time after treatment.

4. Observations by local WDFW biologists, indicate the lake is frequently used by osprey, bald eagles, white pelicans and numerous species of waterfowl. Restocking of the lake post-rehab with sufficient fingerling rainbow should provide an uninterrupted food source for the

piscivorous birds. The reduction in carp numbers should increase habitat quality for resident and migratory waterfowl.

V. MITIGATING FOR ADVERSE IMPACTS:

1.Trout, panfish and bass survival and growth will be greatly enhanced. No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake.

2. Disturbance of waterfowl during treatment or by the anticipated fishery will be offset by the increased habitat quality for resident and migratory waterfowl. There is no known chronic risk to any avian species at the levels of rotenone to be applied to the listed waters.

3. There is no known chronic risk to any mammals, wild or domestic, at the levels of rotenone to be applied to the listed waters.

4. The landowners will be notified of the rehabilitation and consequent exposure of livestock to rotenone. There is no known risk to livestock, and there are no label restrictions regarding application of waters used to water livestock.

5. Treatment will be conducted when the irrigation season is over and water is no longer needed.

7. Protective gear for the eyes, face, hands and clothes will be supplied on-site for all purveyors of rotenone.

8. The lake will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish.

VI. RECREATIONAL IMPACT: also see I.A., II and III

Sprague Lake. The level of participation has dwindled to 4.7 AD/SA/YR this trend is likely to continue or decline if no action is taken. Given the success of the planned management action, as many as 60,000 fishing days per year are expected to be expended on the Sprague Lake recreational fishery.

VII. ECONOMIC IMPACTS:

Rehabilitation would restore the fishery and associated economic activity. An estimated minimum of 25,000 or more trips per year will be made to Sprague Lake as a result of the proposed management action, with an economic impact totaling $790,000 per year (2007 dollars; based on *USFWS 2001 Survey of Fishing, Hunting and Wildlife-Associated Recreation* estimate of $31.50 per trip).

The cost of treatment will be approximately $447,380, including restocking costs. However, the subsequent boost to statewide, local economies, and potential increases in fishing license sales will more than offset that cost within two years after treatment.

VIII. RELATED MANAGEMENT ACTION:

Sprague Lake Replanting Plan

SPECIES	1986	2008	fish/surface acre
bluegill adults	1,055	1,000	.53
bluegill yearlings	15,642	15,000	8.07
black crappie adults	0	1,000	.53
black crappie yearlings	0	15,000	8.07
white crappie adults	0	1,000	.53
largemouth bass adults	1,127	300	.16
largemouth sub-adults	1,750	2,000	1.08
largemouth bass yearlings	16,430	10,000	5.38
channel catfish yearlings	4,344	10,000	5.4
tiger musky fingerlings	0	900	
rainbow fry	75,460	400,000	
rainbow legals	94,198	100,000	
lahontan cutthroat fry	100,162	100,000	53.8
white sturgeon yearlings	0	25	.01

The approach to restocking Sprague Lake will be similar to 1985, except there will be no smallmouth or walleye restocked post rehabilitation. WDFW will reserve walleye for a later date, to be used if the proposed predator population cannot control the panfish populations. The only new species to be added will be tiger musky. Tiger musky will be planted after the establishment of the other warmwater species as an apex predator that will assist in reducing overall densities of panfish and unwanted species.

IX. PUBLIC CONTACT:

Public concern over the decreasing use and quality of the Sprague Lake fishery ultimately instigated the project. There were numerous small meetings in the past 2 years with Sprague Lake Users Group, Ducks Unlimited and The Inland Empire Flyfishing Club. Their efforts to get WDFW involved in correcting the fishery moved us more rapidly in the direction of rehabilitating Sprague Lake.

WDFW formed a formal stakeholders group, the Sprague lake Workgroup, to discuss fishery management options for Sprague Lake. This group met twice in the past two years.

The first meeting occurred May 13th, 2006. The meeting was held to review with the stakeholders all of the possible management options that could be undertaken to improve the fishery at Sprague lake. Additionally WDFW committed to conducting a creel survey to determine angler use and compare it to historical angler use. The table below lists the attendees.

Name	Affiliation
Bruce Bolding	WDFW
Clare Cranston	Richland Rod and Gun Club
Al Cunningham	Inland Empire Flyfishing Club

Bill Demaris	Inland Empire Bass Club
Chris Donley	WDFW
Hugh Evans	Inland Empire Flyfishing Club
Bob Gibbons	WDFW
Rex Harder	Agricultural Producer/Landowner
Scott Haugen	Four Seasons Resort/Sprague Lk.
Joe Hinson	Spokane Walleye Club
Steve Jackson	WDFW
Jeff Korth	WDFW
John Malaby	Sprague Lake Users Group
Joe Miller	WDFW
Steve Nelson	Sprague Lake Users Group
Dick Odell	Inland Fish Policy Advisory
Rudy Plager	Adams County Commissioner
Tom Pollack	Auburn Sportsmans Club
Jim Revann	Western Bass Club
Fred Shiosaki	WDFW Commission
Dave Smith	Columbia basin Walleye Club
Jim Uehara	WDFW

The second meeting convened on March 10th, 2007, WDFW presented the findings of the creel survey and it was discussed with the stakeholders that angler use was reduced significantly from the late 1980s and early 1990s. It was discussed and decided amongst the stakeholders that steps in fish management should be taken to alter the existing fish population in Sprague Lake. At that time, WDFW recommended that the lake be treated with rotenone and the fishery re-started to provide for greater recreational value. It was agreed upon by the stakeholders group that this was a valid approach to improving the fishery. There was some minor opposition to this proposal but the majority of stakeholders saw that the rotenone treatment approach would increase recreational activity and economic productivity. The table below lists the attendees.

Name	Affiliation
Bruce Bolding	WDFW
Dave Broxson	Sprague lake Users Group
Clare Cranston	Richland Rod and Gun Club
Al Cunningham	Inland Empire Flyfishing Club
Bill Demaris	Inland Empire Bass Club
Marc Divens	WDFW
Chris Donley	WDFW
Chuck Dunning	Walleyes Unlimited
Hugh Evans	Inland Empire Flyfishing Club
Gary and Dorothy Giddings	Sprague Lake Landowners
Rex Harder	Agricultural Producer/Landowner
Scott and Jane Haugen	Four Seasons Resort/Sprague Lk.
Steve Jackson	WDFW
Jeff Korth	WDFW
Rich Landers	Spokesman Review
Ivan Lines	Ducks Unlimited
Monica Metz	Sprague Lake Resort
Mikal Moore	WDFW

Steve Nelson	Sprague Lake Users Group
Dick Odell	Inland Fish Policy Advisory
George Potter	Inland Empire Flyfishing Club
Rudy Plager	Adams County Commissioner
Dave Smith	Columbia basin Walleye Club
Gary Stiles	Northwest Bass
Jim Uehara	WDFW
John Whalen	WDFW

March 3, 2007, Chris Donley gave a presentation to the Inland Fish Policy Advisory Group (IFPAG) in Olympia Washington. The IFPAG was presented with the proposal to treat Sprague Lake with rotenone. There was general agreement that the proposal was acceptable and a recommendation was made to the Director of WDFW to pursue implementation of this project.

WDFW staff presented information on the Sprague Lake fishery and management recommendations to a meeting of the Washington Fish and Wildlife Commission on June 1, 2007. Members of the Sprague Lake stakeholders group, as well as several Adams County and Lincoln County Commissioners attended this presentation.

Chris Donley, Jeff Korth and Steve Jackson worked with Madonna Luers to develop a media release discussing the project. The media release was distributed to most of the newspapers and other media within the area of influence of WDFW. Multiple radio and newspaper articles were done on the Sprague Lake project.

Chris Donley, Jeff Korth and Steve Jackson visited multiple walleye and bass clubs statewide to discuss the proposal to treat Sprague Lake with rotenone. There were individuals that were opposed to the treatment, but no club to this date has expressed a formal dissenting opinion towards the project. Clubs visited included Walleyes Unlimited, Western Washington Walleye Club, Spokane Walleye Club, Columbia Basin Walleye Club, Potholes bass Club, Spokane Bass Club, Inland Empire bass club and others.

July 10th, 2007, a public meeting was held in Olympia to review the proposed Sprague Lake rehabilitation proposal as well as other proposed rehabilitation projects. Jon Anderson and Bob Leland were representing WDFW at this Meeting. No interested individuals attended from the public. Jon Anderson and Bob Leland stayed at the prescribed meeting place until 7:30 pm at which time the meeting was adjourned due to non-attendance.

July 11th, 2007, a public meeting was held in Ephrata to review the proposed Sprague Lake rehabilitation proposal as well as other proposed rehabilitation projects. Four individuals attended and were interested in discussing the proposal, but were not opposed to the project.

July 12th, 2007, a public meeting was held in Spokane to review the proposed Sprague Lake rehabilitation proposal as well as other proposed rehabilitation projects. 25 individuals from the public attended, the overall meeting tone was positive. The general opinion was that the project was a good idea and that the re-started fishery was anticipated to be a good thing for anglers in the Spokane area.

One individual expressed his opposition to the project, he felt that Sprague Lake was the only "small boat" walleye fishery in Washington. He and his daughters have enjoyed thousands of hours on the lake and they are upset to see the current fishery modified. He did concede that the fishery has been receiving very little use, and that our efforts are rational given the objectives that we stated.

July 12th, 2007, a public meeting was held in Prosser to review the proposed Sprague Lake rehabilitation proposal as well as other proposed rehabilitation projects. Two individuals were in attendance, one individual expressed support for the project. There was no opposition voiced for the project.

LAKE MANAGEMENT PLAN

Water: Chopaka Lake

Management Type: Trout Only

Location: Six miles north of Loomis via Toats Coulee Road, Section 4, T39N, R25E and Section 33, T40N, R25E

Size: 149 acres, 79 feet maximum depth, 6,556 acre-feet

Water Source: Ground water (underground springs), surface water (Nine Mile Creek diversion)

Outflow: Chopaka Creek (intermittent)

Management History: Chopaka Lake is one of the premier fly-fishing trout waters in the state of Washington. Anglers from all over the Northwest come to the lake to fish for rainbow trout, which can attain sizes as large as 24". The lake opens on the last Saturday in April and closes October 31st. The lake is fly-fishing only with a one fish limit, and motors are not allowed. Fingerling (3"-4") rainbow plants normally produce yearling trout 12"-14", age 2 fish 14"- 16", and age 3-4 fish 16"-20". Daily catch rates of ten to twelve fish were common, even with an increase in fishing pressure over the years.

However, within the last three to four years, more and more anglers have expressed concern about the presence of smallmouth bass in the lake and subsequent effects on the trout fishing. Historical evidence indicates that the bass may have been illegally planted in the 1980's, but that the trout fishing held up well in spite of the increasing competition. Recently though, the bass numbers have grown to the point where fingerling rainbow plants in the spring produce very few yearling fish, due to heavy bass predation. Catch rates have gone from 10-12 fish per day per angler to 1-2 fish per day. Some large fish do remain in the lake, but the age structure in the trout population has been altered to the point where the older fish are the only individuals remaining. Recent efforts to reduce the bass population and subsequent effects on the rainbow trout, was met with limited success. Up to 50 adult smallmouth bass were removed by angling methods, but it was felt that the bass population was too substantial to be impacted much by the removal process.

Current Management Objectives:
Management at Chopaka should concentrate on a single species, quality trout, fly-fishing only water. Maintain present opening day status with an October 31 closure. Efforts should be made to provide multiple fish days with a majority of the trout within the 14"-18" size range. Fish planting should be geared to providing adequate numbers, but without sacrificing the condition and robust nature of the population.

Fishery Objectives:

Species	Type	Category	Fish/hour	Fish/angler	Ave size
Rainbow	Quality	Fly-fishing	1-2	5-6	20% 12"-14" 60% 14"-18" 20% 18"+

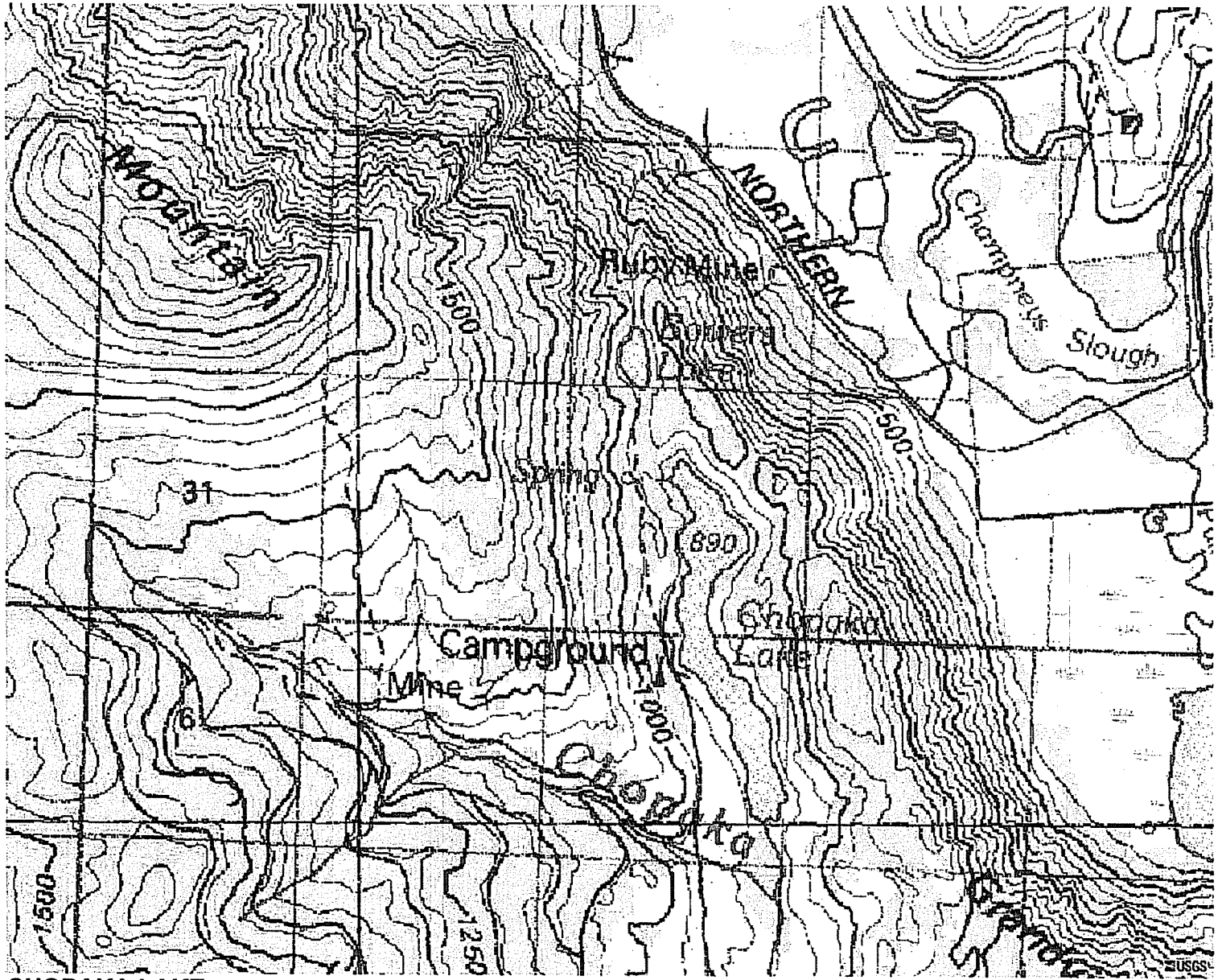
Angler use objective (# angler days): 1000-2000

Stocking Objectives:

Lake	Species	Total Fish	Fish/Acre	Fish/pound	Planting Month
Chopaka	Rainbow	8,000	54	50+	April/May

Management Strategy:

- Check yearling growth in spring; should be about 12-13 inches, adjust stocking rate and fish size as necessary
- Maintain at least 50% of the catch at fish within the 14"-18" range
- Monitor angling activity and catch rates periodically throughout season
- Consider use of sterile, triploid rainbow trout for stocking
- Closely monitor any invasive species and react immediately to control population by all means before treating with rotenone (angling, electroshocking, netting, and regulation changes).



CHOPAKA LAKE

PRE-REHABILITATION PLAN

Chopaka Lake

I. PROPOSAL

A. Justification for Proposed Rehabilitation

- (1-2) Chopaka Lake has been one of the premier fly-fishing trout waters in the state of Washington for many years. Illegal introductions of smallmouth bass back in the 1980's seemed to show no ill effects on the trout fishery, but in recent years, the bass population has increased to the point where trout survival has been compromised. Fingerling trout plants have produced very few yearling fish the following spring and the trout population structure has been skewed to reveal just a few large individual fish inhabiting the lake. In addition, late spring sampling of smallmouth bass indicated that much of the stomach contents of the bass contained remnants of the smaller-size rainbow plants. Planting larger rainbow trout could prolong the fishery, but are much more expensive to produce at the hatcheries and could be used at other less productive waters instead. Whereas this might be an attractive alternative, it does not solve the problem of an increasing bass population and subsequent future effects on the fishery. In order to provide a quality fishing experience for the type of angler that fishes Chopaka, a trout only concept must be used. The fact that bass are caught on a regular basis by anglers diminishes the aesthetics and has contributed to a severe decline in angler use of the lake. Treatment of the lake is needed to restore the quality fishery that once existed.

- (3) Primary management of these waters is for trout only.

- (4) Chopaka Lake was proposed for treatment in October 1986 for removal of invasive species, but was not done at that time.

B. Physical Description of Water Proposed for Rehabilitation

- WATER: Chopaka Lake
- LOCATION: Sec 4, T39N, R25E, and Sec 33, T40N, R25E, Okanogan Co.
- SURFACE ACRES: 149
- MAX. DEPTH: 79
- VOLUME: 6,556 acre-feet
- OUTLET: Chopaka Creek (intermittent)
- STREAM: MILES N/A FLOW (cfs)
- PUBLIC ACCESS: Bureau of Land Management, Department of Natural Resources
- LAND OWNERSHIP: Public 80% Private 20%;
- ESTABLISHED RESORTS: None

C. Proposed Management Actions

- WATER: Chopaka Lake
- TARGET SPECIES: Smallmouth Bass
- DATE LAST REHABED: Never Rehabilitated
- PROPOSED TREATMENT DATE: Sept 2007
- REPLANTING DATE: Late-spring 2008
- SPECIES: Rainbow trout
- STOCKING: 5,000 catchables (12") and 8,000 fingerlings (4")
- PROPOSED TOXICANT: Rotenone, powder and liquid
- CONCENTRATION: 1 ppm
- AMOUNT (ROTENONE AT 5% ACT. INGRED): 17,719 lbs, 30 gal liquid

- METHOD OF APPLICATION: pumper boats - slurry and spray; ATV with sprayer; small boat with small sprayer, backpack sprayers
- CREW DESCRIPTION: Leader Robert Jateff, Personnel 10-12

II. PURPOSE:

- Chopaka Lake has been managed as quality trout water since the 1970's. Complete rehabilitation is the only feasible method of restoring these waters to the trout only management scheme. Complete removal of all competing species is the goal of the rehabilitation.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

- We intend to restore Chopaka Lake to its historic trout fishery, and improve its popularity by maintaining quality trout throughout the duration of the season. Success of this measure will be apparent during annual creel surveys and population sampling. Given a reasonable chance of eliminating the populations of undesirable species, the beneficial effects should be noticeable one-two years post treatment.

IV. RESOURCE IMPACTS:

- Target species: smallmouth bass

- District and Regional Habitat, Wildlife and Non-Game biologists have been appraised of our rehabilitation plans. Net sampling was conducted in 2006 to determine if any state listed aquatic species existed within the lake (none were found). No objections were raised, and only cautionary concerns were expressed on the potential impacts to non-targeted species.

- According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of the population average 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so.

- Participation in the trout fisheries should exceed that currently found for existing fisheries. The water in the lake is used for both stock watering and recreation. Dead fish along the shoreline will not be a public nuisance since the lake will be closed to fishing and there are no shoreline residents.

- Observations by local WDFW habitat and wildlife biologists indicate presence of waterfowl that are partially dependent upon fish as a food source. Restocking of the lake post-rehab with sufficient fingerlings should provide an uninterrupted food source for the fish eating birds.

V. MITIGATING FOR ADVERSE IMPACTS:

- Trout survival and growth will be greatly enhanced. No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake. Disturbance of waterfowl during treatment or by the anticipated fishery will be offset by increased food availability as the uncontrollable numbers of spiny-rayed fishes are eliminated in favor of easily balanced populations of trout.

- Water will be confined to the lake proper, and treatment will be conducted in the fall when the lake is at its lowest level.

- Protective gear for the eyes, face, hands and clothes will be supplied on-site for all purveyors of rotenone.

- The lake will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish. The landowners will be notified of the rehabilitation and consequent exposure of livestock to rotenone.

VI. RECREATIONAL IMPACT: also see I.A., II and III

- Recreational angling opportunity will be increased if the undesirable species are removed from Chopaka Lake. The level of participation will dwindle to almost nothing if no action is taken immediately. Given the success of the planned management action, as many as 1,000-2,000 fishing days are estimated for the season. Anglers should average 5-6 fish per day within the 14"-20" range. Yearling trout should average about 12"-14", two year old fish 14"-16", and three to four year old fish 16"-20".

VII. ECONOMIC IMPACTS:

- Rehabilitation would restore the fishery and associated economic activity. An estimated 1,000-2,000 angler trips will be made to Chopaka Lake as a result of the proposed management action, with an economic impact ranging from $132,000 to $264,000 per year (2004 dollars; based on WDW estimate of $132 per trip). Fingerling plants will cost the agency $1,120, and can be easily accomplished under current hatchery programs.

- The cost of treatment will be approximately $30,000, but the increase in license sales and subsequent boost to the local economy will more than offset that loss within two-to-three years after treatment.

VIII. RELATED MANAGEMENT ACTION:

- Approximately 5,000 catchable (12") rainbow trout will be stocked in the early spring to provide immediate fishing opportunity with a follow up of 8,000 fingerling (4") rainbow trout in late spring. After the first year, subsequent fish plants will consist of fingerling trout only. Creel checks will be done annually on Chopaka Lake, as well as monitoring for invasive species. Aggressive techniques will be employed when competing species are first noticed, to help in controlling the population and to reduce the possibility of any future rehab.

IX. PUBLIC CONTACT:

Public concern over the increasing numbers of lakes in Okanogan County with undesirable species infestations prompted this action.

Public meetings were held during July 2007 in Ephrata, Spokane, Prosser, and Olympia to explain DFW's 2007-08 rehabilitation proposals, assess public opinion, and address local concerns. The announcement was provided statewide and to area papers and radio stations and mailed to landowners and residents near the lakes.

The public meeting in Ephrata was held at 7 p.m. on July 11 at the WDFW Northcentral Region Office. Four people attended, including a representative of the WA Dept of Ecology. Most questions concerned the rehabilitation program in general. The public participants were primarily interested in the Chopaka and Sprague lake treatments, and all were in favor.

The public meeting in Spokane was held at 6 p.m. on July 12 at the WDFW Eastern Region Office. Twenty-five people attended, most to discuss the Sprague Lake proposal, and the overall meeting tone was positive. No questions concerning Chopaka Lake arose.

The public meeting in Prosser was held at 7 p.m. July 12 at the Benton Rural Electric Association building. Two people attended. The public participants were primarily interested in the Byron and Sprague lake treatments, and all were in favor. No questions concerning Chopaka Lake arose.

The public meeting in Olympia was held at 7 pm on July 10, 2007 at the Dept of Natural Resources Building. No one from the public attended.

With approximately 50% of the lake's users living outside Okanogan County, actual percentages pro and con are difficult to obtain. Public support may be best judged by the number of participants in the fishery (vis a vis Recreational Impacts).

Comments on the SEPA for rehabilitations statewide will also be accepted during the month of August. The SEPA can be found on WDFW or WA Dept of Ecology's web sites, or at County offices (usually Planning Commission). Additional comments may be sent directly to WDFW via mail or e-mail.

Initiated by: Region Two Fisheries Management

LAKE MANAGEMENT PLAN

Water: Blue Lake (Lime Belt Region)

Management Type: Trout Only

Location: Six miles NW of Riverside, N of Omak, Section 6, T35N, R26E

Size: 16 acres, 25 feet maximum depth; 240 acre-feet

Water Source: Ground water (underground springs), surface water (snow melt)

Outflow: None

Management History: Blue Lake is a small, but important fishery for Okanogan County. The lake is a year round fishery with statewide gear rules and bag limits for trout. Eastern brook trout, as well as rainbow and cutthroat have been planted over the years. During the winter, people can access the lake via snowmobile to fish through the ice, and there is a WDFW access site located at the lower end with an area for launching car top boats and float tubes.

In year 2000, tiger trout (brook x brown) were planted in an effort to not only provide another trout species for the angler, but hopefully to reduce some of the spiny ray population that had been reported caught. The tiger trout did well, but were less than successful in cropping off the invasive non-trout species.

Within the last few years, reports have been steadily increasing of largemouth bass being caught in lieu of brook trout. Catch rates for the trout have been poor as the incidence of other non-trout species has increased and net surveys in spring 2007 revealed 50% of the catch made up of brown bullheads and largemouth bass. Condition of the brook trout continues to decline in Blue Lake as well due to increasing competition with the spiny rays present.

Current Management Objectives:
Management should focus on a single species trout fishery. A switchover to an opening day lake with selective gear rules and a two fish limit may help to sustain the population longer into the season. Smaller fish plants of native cutthroat could be used to provide a quality selective fishery that could sustain some harvest activity. The addition of a few triploid eastern brook or tiger trout could help to keep any remnant populations of either bullheads or bass in check.

Fishery Objectives:

Species	Type	Category	Fish/hour	Fish/angler	Ave size
Cutthroat	Quality	Selective	2-3	5-6	80% 11"-13" 20% 13"-15"

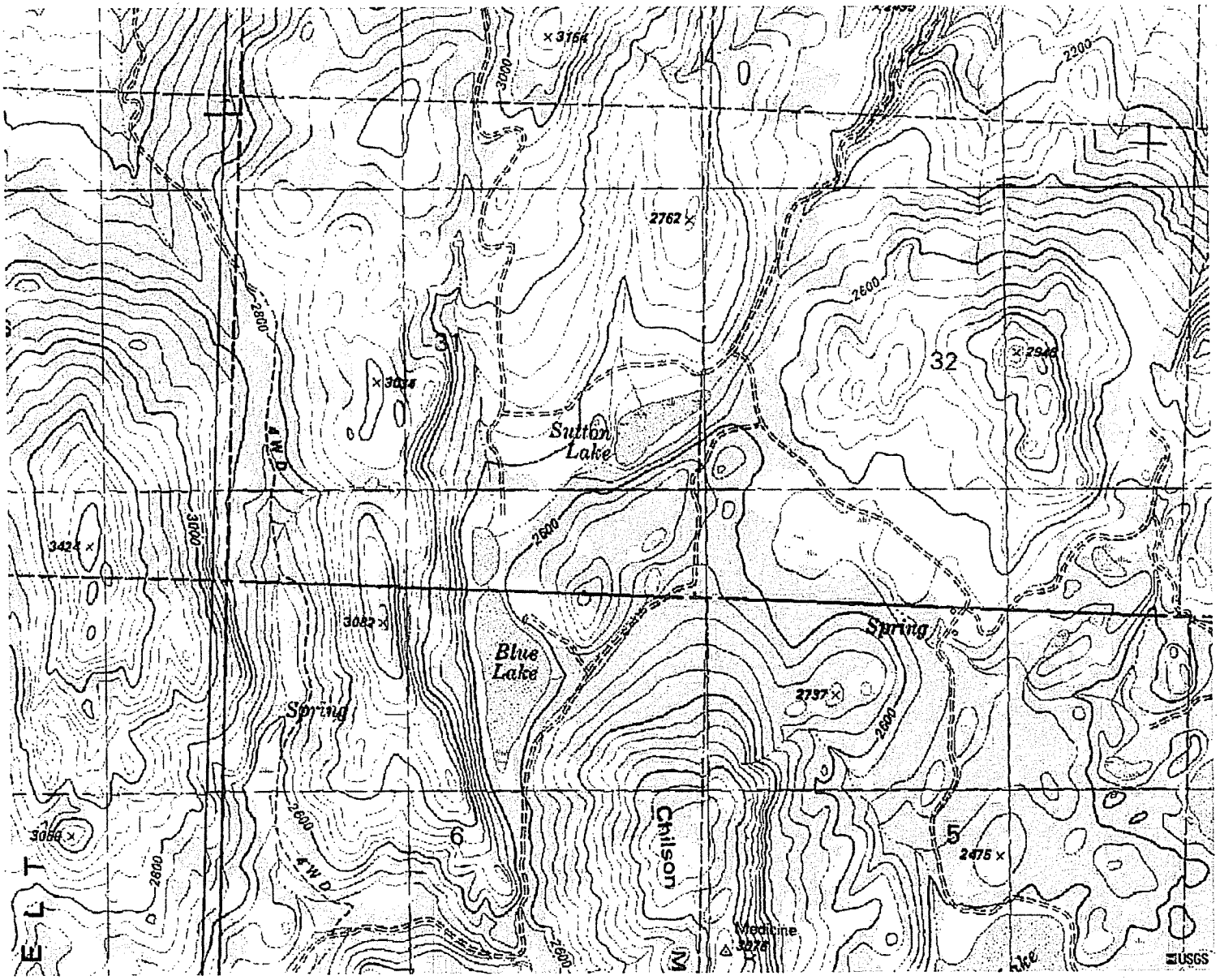
Angler use objective (# angler days): 500

Stocking Objectives:

Lake	Species	Total Fish	Fish/Acre	Fish/pound	Planting Month
Blue	Cutthroat	3,000	188	100	Sept/Oct

Management Strategy:

- Check yearling (1+) survival in spring; should be about 5-6 inches, 2+ fish should be 11"-12", adjust stocking rate and fish size as necessary
- Monitor angling activity and catch rates periodically throughout season
- Consider use of sterile eastern brook or tiger trout for control of spiny rays
- Closely monitor any invasive species and react immediately to control population by all means before treating with rotenone (angling, electroshocking, netting, and regulation changes).



BLUE LAKE (LIME BELT)

PRE-REHABILITATION PLAN

Blue Lake (Limebelt Region)

I. PROPOSAL

A. Justification for Proposed Rehabilitation

- (1-2) Blue Lake is an important trout fishery, which provides local residents an opportunity to fish a small body of water in a pristine setting. Recent illegal introductions of brown bullhead catfish and largemouth bass have seriously compromised the trout fishing through competition and predation. Angler usage at the lake has dropped off considerably as well prompting a recent WDFW net sampling survey, which indicated poor trout condition and an increasing spiny ray population. Treatment is needed at this time to restore the lake back to trout only water.

- (3) Primary management of these waters is for trout only.

- (4) Blue Lake has never been proposed for rehabilitation

B. Physical Description of Water Proposed for Rehabilitation

- WATER: Blue Lake (Limebelt Region)
- LOCATION: Sec 6, T35N, R26E, Okanogan Co.
- SURFACE ACRES: 16
- MAX. DEPTH: 25
- VOLUME: 240 acre-feet
- OUTLET: NONE
- STREAM: MILES N/A FLOW (cfs)
- PUBLIC ACCESS: WDFW Public Fishing Access Area
- LAND OWNERSHIP: Public 20% Private 80%;
- ESTABLISHED RESORTS: None

C. Proposed Management Actions

- WATER: Blue Lake (Limebelt Region)
- TARGET SPECIES: Brown Bullhead Catfish, Largemouth Bass
- DATE LAST REHABED: Never Rehabilitated
- PROPOSED TREATMENT DATE: Sept/Oct 2007.
- REPLANTING DATE: Fall 2008
- SPECIES: Cutthroat/Eastern Brook/Tiger Trout
- STOCKING: 3,000 fingerling CT (3")/sub-yearling EBT and/or Tiger Trout
- PROPOSED TOXICANT: Rotenone, powder and liquid
- CONCENTRATION: 3 ppm
- AMOUNT (ROTENONE AT 5% ACT. INGRED): 1,946 lbs, 10 gal liquid
- METHOD OF APPLICATION: pumper boats - slurry and spray; ATV with sprayer; small boat with small sprayer, backpack sprayers
- CREW DESCRIPTION: Leader Robert Jateff, Personnel 4-6

II. PURPOSE:

- Blue Lake has been managed as trout waters since the 1970's. Complete rehabilitation is the only feasible method of restoring these waters to the trout only management scheme. Complete removal of all competing species is the goal of the rehabilitation.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

- We intend to restore Blue Lake to its historic trout fishery, and improve its popularity by maintaining quality trout throughout the duration of the season. Success of this measure will be apparent during annual creel surveys and population sampling. Given a reasonable chance of eliminating the populations of undesirable species, the beneficial effects should be noticeable one-two years post treatment.

IV. RESOURCE IMPACTS:

- Target species: brown bullhead catfish and largemouth bass

- District and Regional Habitat, Wildlife and Non-Game biologists have been appraised of our rehabilitation plans. Sampling was conducted in summer 2007 to determine if any state listed aquatic species existed within the lake (none were found). No objections were raised, and only cautionary concerns were expressed on the potential impacts to non-targeted species.

- According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of the population average 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so.

- Participation in the trout fisheries should exceed that currently found for existing fisheries. The water in the lake is used for stock watering and recreation. Dead fish along the shoreline will not be a public nuisance since the lake will be closed to fishing and there are no residents along shoreline.

- Observations by local WDFW habitat and wildlife biologists indicate presence of waterfowl that are partially dependent upon fish as a food source. Restocking of the lake post-rehab with sufficient fingerlings should provide an uninterrupted food source for the fish eating birds.

V. MITIGATING FOR ADVERSE IMPACTS:

- Trout survival and growth will be greatly enhanced. No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake. Disturbance of waterfowl during treatment or by the anticipated fishery will be offset by increased food availability as the uncontrollable numbers of spiny-rayed fishes are eliminated in favor of easily balanced populations of trout.

- Water will be confined to the lake proper, and treatment will be conducted in the fall when the lake is at its lowest level.

- Protective gear for the eyes, face, hands and clothes will be supplied on-site for all purveyors of rotenone.

- The lake will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish. The landowners will be notified of the rehabilitation and consequent exposure of livestock to rotenone.

VI. RECREATIONAL IMPACT: also see I.A., II and III

- Recreational angling opportunity will be increased if the undesirable species are removed from Blue Lake. The level of participation will dwindle to almost nothing if no action is taken immediately. Given the success of the planned management action, as many as 500 fishing days are estimated for the season. Anglers should average 5-6 fish per day within the 11"-13" range.

VII. ECONOMIC IMPACTS:

- Rehabilitation would restore the fishery and associated economic activity. An estimated 500 angler trips will be made to Blue Lake as a result of the proposed management action, with an economic impact of $66,000 per year (2004 dollars; based on WDW estimate of $132 per trip). Fingerling and sub-yearling plants will cost the agency $500, and can be easily accomplished under current hatchery programs.

- The cost of treatment will be approximately $5,000, but the increase in license sales and subsequent boost to the local economy will more than offset that loss within two-three years after treatment.

VIII. RELATED MANAGEMENT ACTION:

- Approximately 3,000 fingerling cutthroat trout (3") and 500 sub-yearling (6") eastern brook or tiger trout will be planted in fall 2008. After the first year, subsequent fish plants will consist of fingerling trout only. Creel checks will be done annually on Blue Lake, as well as monitoring for invasive species. Aggressive techniques will be employed when competing species are first noticed, to help in controlling the population and to reduce the possibility of any future rehab.

IX. PUBLIC CONTACT:

- Public concern over the increasing numbers of lakes in Okanogan County with undesirable species infestations prompted this action.

- A public meeting will be held in Ephrata on Wednesday, July 11th at the WDFW Regional Office. Letters have been written to each individual landowner describing treatment proposal.

Initiated by: Region Two Fisheries Management

LAKE MANAGEMENT PLANS

updated July, 2007 - J.W. Korth

Water(s): Corral, Blythe, Chukar, and Scaup lakes

Location: Seep Lakes Wildlife Area and Columbia National Wildlife Refuge, Sec 14, 15 and 16, T17N R28E; approximately 15 miles northwest of Othello and 0.5 miles south of the southwest corner of Potholes Reservoir, Grant County, WA

	Size:	Max Depth:	Volume:
Corral	78 acres	65 feet	2,570 acre-feet; 6,985,630,080 lbs. H2O
Blythe	32 acres	35 feet	588 acre-feet; 1,598,268,672 lbs. H2O
Chukar	13 acres	24 feet	192 acre-feet; 521,856,000 lbs. H2O
Scaup	9 acres	14 feet	64 acre-feet; 173,950,000 lbs. H2O

Water Source: Subsurface seepage springs from Potholes Reservoir; outlet from Corral is a permanent, small creek (~1,600 ft., 2-3 cfs, includes a natural barrier (falls) to upstream fish migration) which drains to Blythe Lake; outlet from Blythe is a permanent, small creek (300 ft., 2-3 cfs) which drains to Chukar Lake; Chukar is intermittently connected to Scaup Lake.

Outflow: Intermittent to Marsh Unit I (lower Crab Creek) from Scaup Lake.

Management History:
The Corral, Blythe, Chukar, and Scaup chain of lakes lie just south of O'Sullivan Dam and Potholes Reservoir and are a tributary to lower Crab Creek. Much of Corral, and all of Blythe, Chukar, and Scaup lakes, are on the Columbia National Wildlife Refuge. These waters have been popular trout fisheries since the 1960s when opening day-type seasons were in effect. Blythe, Chukar, and Scaup lakes once provided the quality of angling sufficient to justify selective fishery regulations.

Corral, Blythe, Chukar, and Scaup lakes are currently open to angling year-round reducing the opening day crowds in favor of prolonged and steady angling pressure. The catch limit is five fish, and bait is allowed. Boating access is available at Corral and Blythe lakes, while anglers must walk into Chukar Lake. Stocking levels for Corral, Blythe, Chukar, and Scaup lakes have hovered around 50,000 rainbow trout. In early years these waters yielded 3-8 trout per trip and yearling trout grew to about 12 inches by opening day. Since the season switch to year around angling in the mid-1970s, fewer but larger fish per angler has been the norm.

The presence of undesirable species of fish is the greatest impediment to maintaining trout fisheries in these waters. Pumpkinseed sunfish were introduced, probably illegally, into the

system during the early 1960s, and six rehabilitations (1965, 1971, 1976, 1983, 1988, 1997) have failed to eradicate this species. Carp, yellow perch, and bass have been eradicated from the system at various times. Crappie were found during the 1997 treatment and continue to persist. Carp entering from Crab Creek were a problem in Blythe, Chukar, and Scaup lakes until the USFWS constructed an adequate barrier to the upstream migration of fish in 1976 on the outlet from Scaup Lake. Corral Lake is isolated by a natural barrier. Lake rehabilitation has provided 4-5 years of very good trout fishing in these waters after each treatment. Fair angling for large trout continues another 3-4 years before treatment is again required.

Compromise with the management priorities of the Columbia National Wildlife Refuge has been an ongoing issue in managing these lakes. The Refuge's primary responsibility is waterfowl management, and the Refuge frequently sees providing angling recreation as a conflicting activity. The Refuge would generally prefer that activity be minimized during the spring so as not to interfere with waterfowl nesting and rearing. Quality outdoor experiences are also promoted.

Replacing the April opener with the year around season was a direct response to Refuge concerns. Stocking catchable-sized fish is not allowed in Refuge waters per national policy, even though the currently allowed fry plants amount to the same type of put-and-take fishery as stocking catchable fish does. Rehabilitation proposals are usually acceptable since the elimination of over-populated species favors waterfowl as well as fish production. Fall rehabilitations are encouraged to avoid nesting and rearing waterfowl. In addition, outlet flows are usually at a minimum during this time of year.

Like WDFW, the Refuge has become more sensitive to the management non-game species during the last decade. At the Refuge's request, Scaup Lake has been removed from fisheries management to create a small haven for other species, particularly amphibians. As Scaup had become prone to low water levels and less than optimal conditions for trout survival, the loss of this portion of the fishery had relatively little impact to the system overall.

A relatively recent (since the late 1980s) management issue for this water has been the increasing number of pisciverous birds frequenting the area. Cormorants and mergansers have become spring breeders and summertime residents. While no uncontested proof of damage to the fishery exists, these species are primarily fish eaters. It is suspected that many of the unpredictable and unexplainable failures of the fisheries, which occur periodically in most of the smaller lakes in the area, could be attributable to these avian species.

T&E Flora and Fauna: Professionals from many resource agencies have visited this site countless times during the last 40 years. No known report exists of any threatened or endangered species habitually found in or near these lakes. Occasional visits from both bald and golden eagles occur, although no nests of these two species are known in the area. Protected species of waterfowl and other birds frequently are found here at times, as well.

Current Management Objectives:
Year around, low-key, production type trout fishery. Five fish limit, no size or gear restrictions. Provide 3 yearling rainbow trout per angler trip for 5-10,000 angler-trips per season.

1. Fishery Objectives:

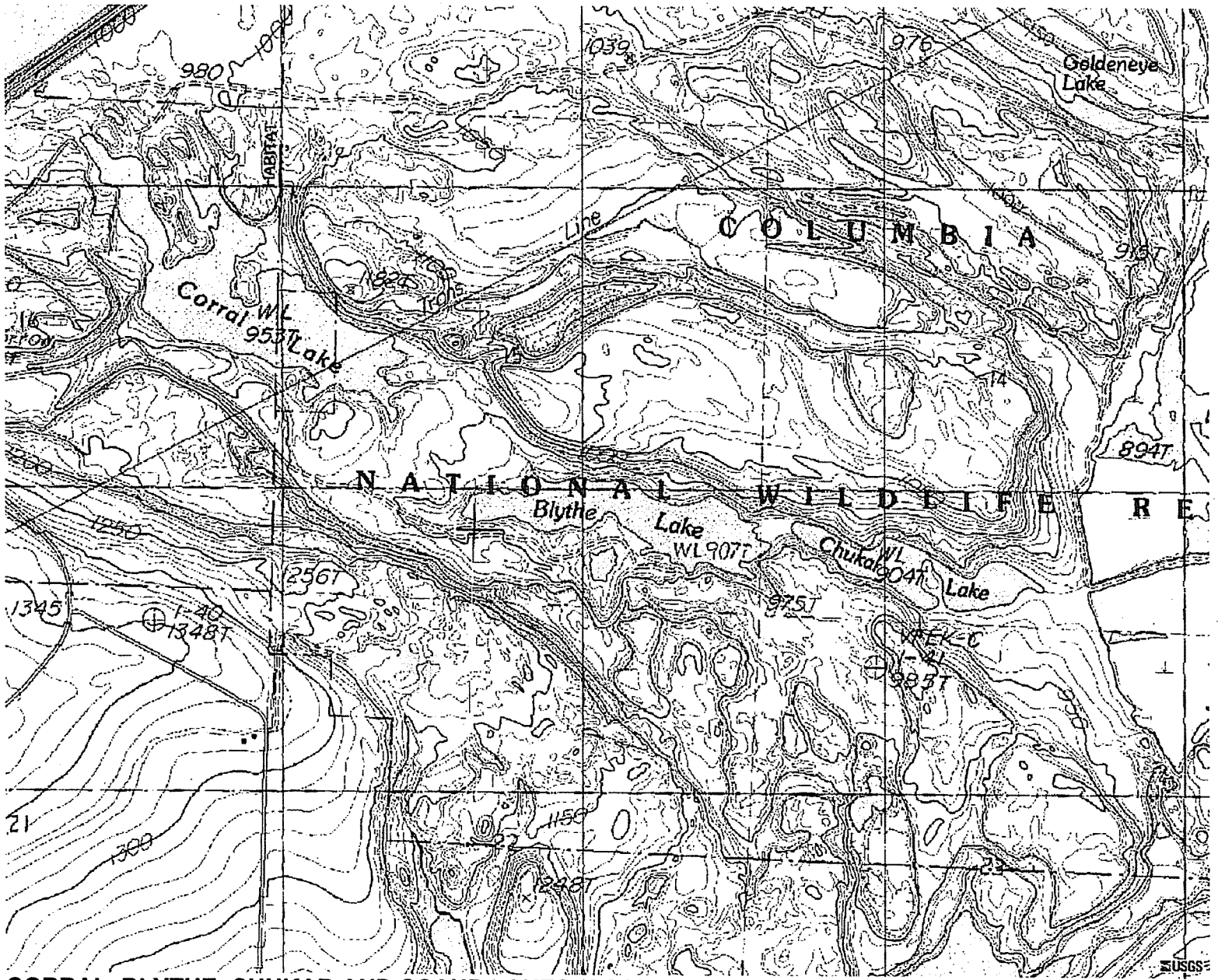
			Number of Fish			Exploit.
Species	Type	Category	/hour	/Angler	Avg.Size	Rate
Rainbow	Prod	Year Around	2	3	12 inches	90% 1-yr-olds

2. Angler use objective (# angler days): Season - 5,000 - 10,000

3. Stocking Objectives:

		Number of Fish Stocked			
Lake	Species	Total	/Acre	/pound	Planting Month
Corral	Rainbow	30,000	385	<80	April-May
	Rainbow	21,000	270	≤ 3	March-April, *first year post rehabilitation*
Blythe	Rainbow	10,000	300	<80	April-May
Chukar	Rainbow	4,000	300	<80	April-May
Scaup	no longer stocked at Refuge request				

Management Strategy:
- Plant rainbow fry in spring.
- Check yearling growth; should be about 12 inches, adjust stocking rate as necessary.
- Harvest 90% of yearling fish by end of season.
- Monitor all fish species periodically by electrofishing or netting.
- Substitute fall fingerlings for at least a portion of the spring fry when competing species begin to impact trout fry survival.
- Control spiny-ray species with rotenone when trout survival is inadequate to produce an acceptable fishery.



CORRAL, BLYTHE, CHUKAR AND SCAUP LAKES (SCAUP LAKE IS EASTERN PART OF "CHUKAR" LAKE)

PRE-REHABILITATION PLAN
Corral, Blythe, Chukar, and Scaup Lakes

I. PROPOSAL

A. Justification for Proposed Rehabilitation

The Corral, Blythe, Chukar, and Scaup chain of lakes lie just south of O'Sullivan Dam and Potholes Reservoir and are a tributary to lower Crab Creek. Much of Corral is WA State Dept of Natural Resources land, some of which is leased to Mar Don Resort and WDFW (access/boat launch). A small area of central Corral Lake is privately owned, and the remainder is on the Columbia National Wildlife Refuge (CNWR). All of Blythe, Chukar, and Scaup lakes, are on the CNWR.

These waters have been popular trout fisheries since the 1960s, averaging 3-5 fish per angler when opening day-type seasons were in effect. Blythe and Chukar lakes once provided the quality of angling sufficient to justify selective regulations. The lakes are currently open to angling year-round, reducing the opening day crowds in favor of prolonged and steady angling pressure. An expanding population of sunfish, and possibly other illegally introduced species are competing with trout fry and depressing trout survival. Anglers rarely pursue sunfish, and the present fishery is a shadow of the former rainbow fisheries that can occur there.

Pumpkinseed sunfish were introduced, probably illegally, into the system during the early 1960s. Six rehabilitations have failed to eradicate this species, thus periodic treatment is necessary to keep the numbers of sunfish down. Carp entering from Crab Creek were also a problem in Blythe, Chukar, and Scaup lakes until the USFWS constructed an adequate barrier to the upstream migration of fish in 1976. A natural barrier isolates Corral Lake. Carp, perch, crappie, and bass have been eradicated from the system at various times.

Lake rehabilitation has provided 4-5 years of very good trout fishing after each treatment. Thereafter, trout survival begins to diminish and the fishery becomes less attractive over time. After 7-8 years, the trout fishery is almost non-existent. Since the last treatment, the proposed rehabilitation will entail superior techniques and equipment not available during previous rehabilitation attempts. Powdered rotenone will be slurried before application to the lake, providing a better distribution of the toxicant. Rehabilitation is desirable during the fall as Potholes Reservoir is usually at its lowest level at that time, and the springs that feed these lakes will be at their lowest flow. This should reduce the amount of sanctuary available to the target species during treatment. Submergent aquatic weed growth may present a problem during a fall rehabilitation, especially in Chukar and Scaup lakes.

Refuge policy favors endemic species management over that of exotic species. While no game fish probably inhabited these waters originally, trout have historically inhabited the Columbia River drainage including Crab Creek. Additionally, the Columbia Basin National Wildlife Refuge was chartered for the primary purpose of waterfowl management. The unchecked proliferation of these spiny-ray species depletes food production for waterfowl as well as for trout.

Alternatives to rehabilitation are costly or impractical. To maintain a comparable fingerling-stocked trout fishery in these waters with catchable-sized fish would take 35,000 catchable rainbow. This would constitute about a third of the District's entire normal allotment of catchable trout. Stocking catchable sized fish costs almost ten times the cost of a fry plant, and Region Two lacks the hatchery space and water to institute a catchable fish-stocking program as a substitute for lake rehabilitation. In addition, Refuge policy forbids planting catchable sized fish in refuge waters, thus advanced fry are the only option available for trout production in Blythe, Chukar, and Scaup lakes. Optimistic estimates of survival of 4-6 inch advanced fry in larger mixed species waters range from 10-20 percent. Spring fry survival in lakes free of competing species ranges from 50-80 percent. It has been 10 years since the last rehabilitation of these lakes, and angling continues to decline. WDFW policy states that lake rehabilitation is an option for eliminating illegally planted and/or undesirable fish to restore the intended management scheme.

B. Physical Description of Water Proposed for Rehabilitation

1. WATER: **Corral Lake**
2. LOCATION: Sec 15 and 16, T17N R28E Grant Co.
3. SURFACE ACRES: 77.6 MAXIMUM DEPTH: 65 feet
4. VOLUME: 2,570 acre-feet; 6,985,630,080 lbs. H2O
5. OUTLET: Permanent, small creek drains to Blythe Lake; includes a natural barrier (falls) to upstream fish migration.
6. STREAM: 1,600 ft. FLOW: 2-3 cfs
7. PUBLIC ACCESS: Entire Lake; includes boat launch and toilets.
8. LAND OWNERSHIP: PUBLIC 85% (WDNR, USFWS/CNWR), PRIVATE 15 %
9. ESTABLISHED RESORTS: None on lake; near-by a resort (Mar Don) and State Park (Potholes Res.)

1. WATER: **Blythe Lake**
2. LOCATION: Sec 15, T17N R28E Grant Co.
3. SURFACE ACRES: 32 MAXIMUM DEPTH: 35 feet
4. VOLUME: 588 acre-feet; 1,598,268,672 lbs. H2O
5. OUTLET: Permanent, small creek drains to Chukar Lake.
6. STREAM: 300 ft. FLOW: 2-3 cfs
7. PUBLIC ACCESS: Entire Lake; includes boat launch.
8. LAND OWNERSHIP: PUBLIC 100% (USFWS/CNWR) PRIVATE 0 %
9. ESTABLISHED RESORTS: None on lake; near-by a resort (Mar Don) and state park (Potholes Res.)

1. WATER: **Chukar Lake**
2. LOCATION: Sec 14, T17N R28E Grant Co.
3. SURFACE ACRES: 13.2 MAXIMUM DEPTH: 24 feet
4. VOLUME: 192 acre feet; 521,856,000 lbs. H2O
5. OUTLET: Permanent, connected at times to Scaup Lake
6. STREAM: 10 ft. FLOW: 2-3 cfs
7. PUBLIC ACCESS: Entire Lake; walk-in.
8. LAND OWNERSHIP: PUBLIC 100% (USFWS/CNWR) PRIVATE 0 %
9. ESTABLISHED RESORTS: None on lake; Resort (Mar Don) and State Park at Potholes Res.

1. WATER: **Scaup Lake**
2. LOCATION: Sec 14, T17N R28E Grant Co.
3. SURFACE ACRES: 9.1 MAXIMUM DEPTH: 14 feet
4. VOLUME: 64 acre feet; 173,950,000 lbs. H2O
5. OUTLET: Intermittent, to Crab Creek (Marsh Unit I).
6. STREAM: 1500 ft. FLOW: 0 cfs at time of treatment; up to 2-3 cfs seasonally.
7. PUBLIC ACCESS: Entire Lake; walk-in.
8. LAND OWNERSHIP: PUBLIC 100% (USFWS/CNWR) PRIVATE 0 %
9. ESTABLISHED RESORTS: None on lake; near-by a resort (Mar Don) and state park (Potholes Res.)

C. <u>Proposed Management Actions</u>

1. WATER: **Corral Lake**
2. TARGET SPECIES: pumpkinseed sunfish, crappie, and possibly yellow perch
3. DATE LAST REHABED: October 29-31, 1997
4. PROPOSED TREATMENT DATE: September-November, 2007
5. REPLANTING DATE: Spring 2008
6. SPECIES: rainbow trout
7. CATCHABLES: 10,000 – 21,000 FINGERLINGS: 30,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1 ppm AMOUNT (ROTENONE AT 5% ACT. INGRED): 6,687 lbs., 30 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 6

1. WATER: **Blythe Lake**
2. TARGET SPECIES: pumpkinseed sunfish, crappie, and possibly yellow perch
3. DATE LAST REHABED: October 29-31, 1997
4. PROPOSED TREATMENT DATE: September-November, 2007
5. REPLANTING DATE: Spring 2008
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FINGERLINGS: 10,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1 ppm AMOUNT (ROTENONE AT 5% ACT. INGRED): 1,465 lbs., 15 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 2-3

1. WATER: **Chukar Lake**
2. TARGET SPECIES: pumpkinseed sunfish, crappie, and possibly yellow perch
3. DATE LAST REHABED: October 29-31, 1997
4. PROPOSED TREATMENT DATE: September-November, 2007
5. REPLANTING DATE: Spring 2008
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FINGERLINGS: 4,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1 ppm AMOUNT (ROTENONE AT 5% ACT. INGRED): 477 lbs., 5 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 2

1. WATER: **Scaup Lake**
2. TARGET SPECIES: pumpkinseed sunfish, crappie, and possibly yellow perch
3. DATE LAST REHABED: October 29-31, 1997
4. PROPOSED TREATMENT DATE: September-November, 2007
5. REPLANTING DATE: none
6. SPECIES: none
7. CATCHABLES: 0 FINGERLINGS: 0
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1 ppm
   AMOUNT (ROTENONE AT 5% ACT. INGRED): 173 lbs. or 21 gal., or in combination.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 2

TOTAL PROPOSED TOXICANT: Rotenone CONCENTRATION: 1 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 8,803 lbs. powder and 50-71 gal. liquid.

II. PURPOSE:

The Washington Department of Fish and Wildlife (DFW) provides many types of fisheries in response to public desires. DFW manages both trout and warmwater recreational fisheries based on many different species of fish and levels of difficulty. Pubic demand for and participation in trout fisheries is very high. These fisheries are prized as opportunities for families to recreate together as well as providing an appropriate challenge for occasional or novice anglers. Year around season trout fisheries provide a relaxed recreational opportunity and are also integral to the state and many local economies.

Corral, Blythe, Chukar, and Scaup lakes have a long history of being managed as trout fisheries. Management intends to return Corral, Blythe, and Chukar lakes to trout fisheries, as per the Management Plans established over 20 years ago. Scaup Lake will be treated, however, no further stocking will occur per Refuge request, and this lake will provide a haven for other non-game species. Only the complete rehabilitation or the stocking of catchable-sized fish can restore the trout fishery in these waters now. Rehabilitation will eliminate or drastically reduce inter-specific competition and predation, allowing the trout fingerlings to flourish. The cost of annually stocking of catchable-sized trout and creating a mixed species fishery would be an order of magnitude greater for the larger trout necessary to attract anglers. Without a very significant capital investment, current resources are not available to provide catchable-sized trout on a regular basis without severely impacting hatchery production for many other fisheries. Managing these waters as warmwater fisheries will not create the same amount of recreation, as evidenced by the decline in participation as the trout fishery ebbs.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

DFW intends to restore Corral, Blythe, and Chukar lakes to popular, easily accessible trout fisheries based on fingerling-stocked trout. The average catch rates should be at least two to three 10-12 inch trout per angler. Success will be measured during random creel contacts and biological surveys. Given a reasonable chance of reducing the populations of undesirable species

dramatically, the beneficial effects should last approximately 6 to 8 years under current management schemes. In addition to reasons listed under Resource, Recreational and Economic Impacts, to abandon these lakes as trout fisheries is to invite other incursions across the state.

IV. RESOURCE IMPACTS:

1. The populations of the target species, pumpkinseed sunfish, and possibly yellow perch and crappie, will be severely and negatively impacted. All are exotic species.

2. Regional Lands, Habitat, Wildlife and Non-Game managers have been appraised of our rehabilitation plans. No unmitigated concerns have been expressed on the potential impacts to non-targeted species.

According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of populations averages 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so. Almost no chance of eliminating an entire population exists.

3. Loss of the following year's fishery will occur for Blythe, and Chukar lakes since Refuge policy forbids planting catchable-sized fish. The fishery will begin again one year after treatment. Hunting will be curtailed during the treatment (about 2 days). These waters are not a source of potable water for humans or livestock. The lakes will be closed to angling, and other recreational uses such as boating, and swimming will be curtailed during the planned period of treatment.

4. Professional biologists and other naturalists have visited this site frequently over the past 40 years. To our knowledge, no endemic, rare, threatened or otherwise listed species will any be impacted by the rehabilitation.

V. MITIGATING FOR ADVERSE IMPACTS:

1. Provided catchable-sized fish are available the following spring, no loss of recreational fishing time will occur for Corral Lake. Trout fry survival and growth for all the proposed waters will be greatly enhanced, and future trout fisheries will attain their previous status. No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake.

Fall rehabilitation will not interfere with waterfowl spring nesting. The eradication of spiny-ray fishes would also benefit waterfowl through increased production of invertebrates. Stocked populations of trout will not be anywhere near as numerous as the current spiny-ray population.

Livestock use of the waters to be treated will not be significantly affected. The concentration of rotenone used in the treatment will be far below that considered harmful to mammals. The

landowners will be notified of the rehabilitation and consequent exposure of livestock to rotenone.

2. Downstream resources will not need to be protected as those waters are infested with carp and any secondary kill ensuing in that area would also be beneficial to waterfowl production.

3. No endemic, rare, threatened or otherwise listed species are known to inhabit this area.

4. Protective wear for the eyes, face and hands will be available for all purveyors of rotenone.

5. Lakes will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish.

VI. RECREATIONAL IMPACT: ALSO SEE PROPOSAL I.A.

Recreational opportunity will be increased. When free of competing species, these lakes are estimated to host 20-30 angler trips per week during the usual angling season, accounting for at least 1,000 recreation-days per year. The lakes could conservatively sustain five times that amount of pressure at the anticipated levels of success.

Angler success should reach three to five fish per trip. Yearling trout should average about 11 inches. Carryovers should be expected to be about 10% of the catch and average 15 inches for 2-year-olds and 18 inches for 3-year-olds.

VII. ECONOMIC IMPACTS:

An estimated minimum of 5,000 trips made to these lakes as a result of the proposed management action would result in an increased economic impact totaling $188,950 per year (1991 dollars; based WDW estimate of $37.90 per trip). If used to its full potential, the annual value could be over $377,900 to the state's economy. The fishery as it now exists generates less than $10,000 per year. Rehabilitation would bring back the fishery and associated economic activity.

The total annual cost to plant these lakes is less than $2,000. The rehabilitation will cost the Department about $30,000 (including costs of rotenone, time, travel). Even if rehabilitations occur every five years, the cost of fry plants (5 yrs.) and the rehab totals $40,000. The cost of stocking catchable-sized trout, if this were possible (see IA), would be nearly $75,000 for this five year period. During this same five years, the fishery would generate at least $750,000 and as much as $1,500,000 to the state's economy.

Estimates for the cost of the enforcement action necessary to curtail the activity of the individuals responsible for illegal fish plants are not available. However, this cost might be looked upon as a statewide expenditure since some preventive benefit would certainly occur as perpetrators find out the Department takes illegal transport and planting of fish very seriously.

VIII. RELATED MANAGEMENT ACTION:

See I.C.6. for fish planting data

Increased penalties and enforcement activities are desirable if WDFW is ever going to dissuade illegal stocking of state managed waters. Educating the public about the costs in Department dollars and time with emphasis on what WDFW might be able to accomplish with those resources would be a very worthwhile activity for O & E. This may result in stemming recruitment to this ill advised group and turning local opinion against the offenders.

IX. PUBLIC CONTACT:

Public meetings were held during July 2007 in Ephrata, Spokane, Prosser, and Olympia to explain DFW's 2007-08 rehabilitation proposals, assess public opinion, and address local concerns. The announcement was provided statewide and to area papers and radio stations and mailed to landowners and residents near the lakes.

The public meeting in Ephrata was held at 7 p.m. on July 11 at the WDFW Northcentral Region Office. Four people attended, including a representative of the WA Dept of Ecology. Most questions concerned the rehabilitation program in general. The public participants were primarily interested in the Chopaka and Sprague lake treatments, and all were in favor. No questions concerning the Corral, Blythe, Chukar, and Scaup chain of lakes arose.

The public meeting in Spokane was held at 6 p.m. on July 12 at the WDFW Eastern Region Office. Twenty-five people attended, most to discuss the Sprague Lake proposal, and the overall meeting tone was positive. The general opinion was that the project was a good idea and that the re-started fishery was anticipated to be a good thing for anglers in the Spokane area. No questions concerning the Corral, Blythe, Chukar, and Scaup chain of lakes arose.

The public meeting in Prosser was held at 7 p.m. July 12 at the Benton Rural Electric Association building. Two people attended. The public participants were primarily interested in the Byron and Sprague lake treatments, and all were in favor. No questions concerning the Corral, Blythe, Chukar, and Scaup chain of lakes arose.

The public meeting in Olympia was held at 7 pm on July 10, 2007 at the Dept of Natural Resources Building. No one from the public attended.

With approximately 50% of the lake's users living outside Grant County, actual percentages pro and con are difficult to obtain. Public support may be best judged by the number of participants in the fishery (vis-à-vis Recreational Impacts).

Comments on the SEPA for rehabilitations statewide will also be accepted during the month of August. The SEPA can be found on WDFW or WA Dept of Ecology's web sites, or at County offices (usually Planning Commission). Additional comments may be sent directly to WDFW via mail or e-mail.

Initiated by: Region Two Fisheries Management

LAKE MANAGEMENT PLAN
Updated May, 2007 – Rocky J. Ross

Water(s): Byron Pond, Sunnyside Wildlife Area

Description: Sunnyside Wildlife Area, Byron Ponds Management Unit, Sections 9,10,11,12, T8N, R23E; approximately 4 miles east of Mabton, Yakima County.

Size:	Maximum Depth:	Est. Depth during treatment:	Volume:
83.72 surface ac.	4 feet	2 feet	147.11 acre feet

OUTLET: Water leaves a control structure and follows a narrow ditch through WDFW land, and then through two private ownerships before falling over a basalt cliff into the Yakima River.
INLET: Three primary sources: 1) a spring that probably originates from an irrigation canal at a higher elevation, 2) overland flow of irrigation wastewater, and 3) pumped water from underground drainage pipes on private lands.

Management History: Irrigation and groundwater enters WDFW property via a canal that originates on adjacent private property. A water control structure was constructed in the late 1940s, which impounds this water in a shallow basin, forming what is considered one of the Byron Ponds. The primary purpose of the ponds and associated wetlands has been for waterfowl production, resting and hunting. However, the ponds have historically supported a spiny ray fishery.

In addition to the use by waterfowl, the treatment area (TA) is used heavily by a wide variety of wetland-associated wildlife species. Surveys will begin in May of 2007 to detect presence of select, reclusive marsh birds such as rails and bitterns.

One of the more significant wildlife uses of the TA is by breeding ducks. Breeding duck use increased dramatically after rotenone treatment to remove carp in 1986. Numbers of duck broods peaked at very high levels in the late1980s, but declined annually to pre-treatment (very low) numbers by summer of 2000. Carp were observed in waters of the TA by the late-1980s, indicating a complete kill was not achieved. Due to the characteristics of incoming water, it is unlikely that the re-infestation occurred through these sources. Instead, based on personal communications, it is likely that all existing waters were not adequately treated with rotenone and some fish escaped the treatment.

Grazing used to occur on this management unit but it was discontinued in 1978. When the pond was drawn down prior to the last rotenone treatment, it allowed emergent vegetation to send up sprouts in the shallow water areas that became de-watered. When the pond level was raised, the emergent vegetation persisted, and the canopy of vegetation reduced the amount of open water. Some local citizens have deducted that removing the cattle has allowed the emergent vegetation to flourish.

The focus of wildlife management in the TA has been to insure habitat quality for breeding ducks and populations of a diverse assemblage of wetland-obligate wildlife species and promote wildlife observation and fishing opportunities that do not result in negative impact to wildlife use.

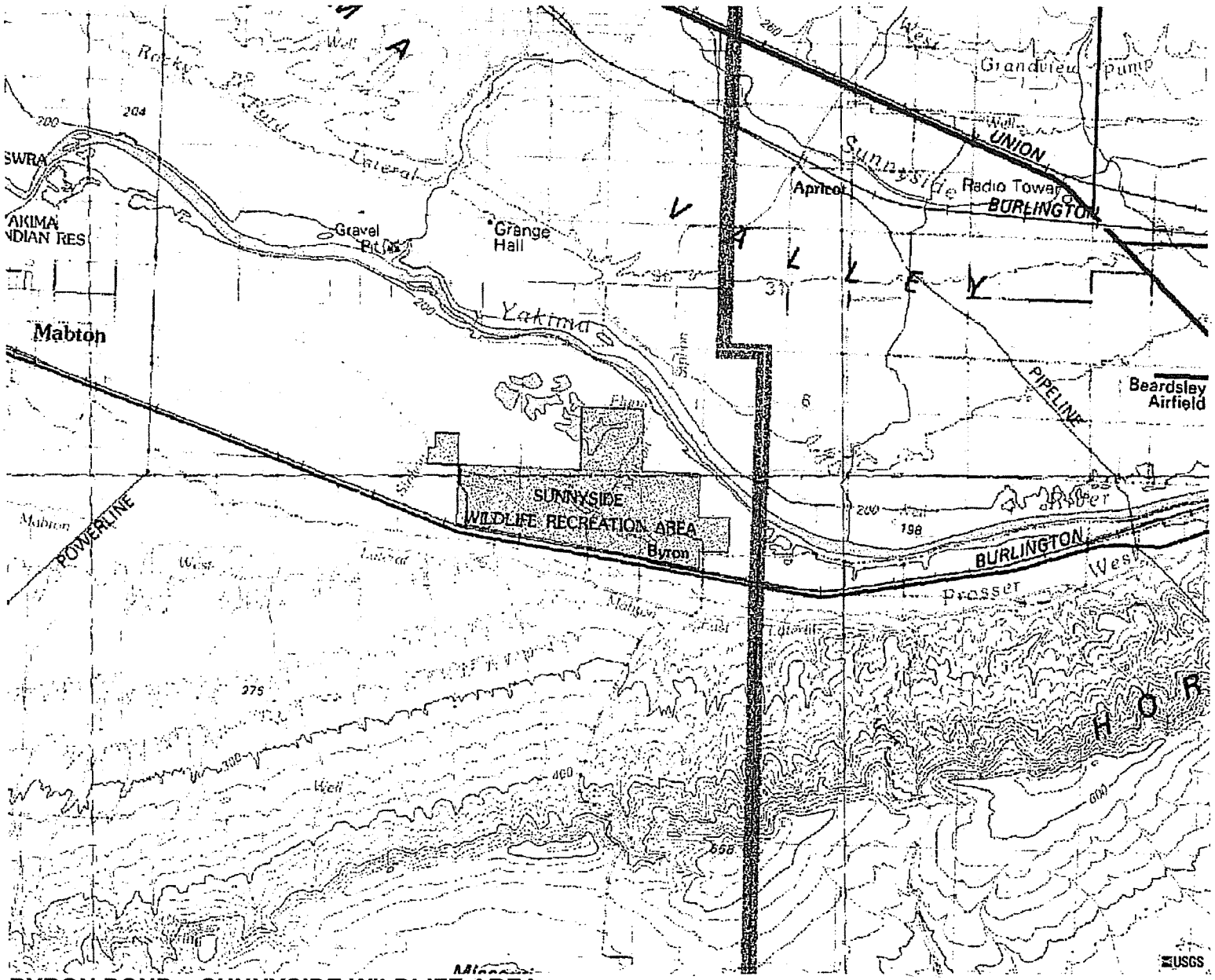
T&E Flora and Fauna: During the preparation of the 1997 Management Plan, a cross-divisional task team (CDTT) made up a list of the following sensitive plant and animal species that do, or could occur on this management unit:

1. Great Blue Heron
2. Bald Eagle
3. Western Grebe
4. Sagebrush Lizard
5. Long-billed Curlew
6. Ferruginous and Swainson's hawks
7. Loggerhead Shrike
8. Black-necked Stilt
9. Merriam's shrew
10. Grasshopper sparrow
11. Sagebrush vole
12. Northern grasshopper Mouse
13. White-tail jack rabbit
14. Desert night snake
15. Black-crowned night heron
16. Burrowing owl

Current Management Objectives: Primary management of the Byron Pond area described above will be for a spiny ray fishery and waterfowl. Because waterfowl production is the top priority, seasonal closures will likely remain in place to minimize disturbance to nesting birds.

Current Wildlife Management Objectives and Strategy:

Current wildlife-related management actions in the TA include: 1) Conducting controlled burns in areas of extensive decadent emergent vegetation to increase the percent of open water, 2) minimizing human disturbance during the nesting period for ducks and geese, 3) maximizing in-water food resources (i.e., invertebrates and submerged aquatic plants) for ducks and geese (e.g., coordinating with Fish Management program for carp removal), 4) promoting wildlife viewing in a manner that minimizes human disturbance of wildlife, 5) implementing management actions to benefit desirable species of wildlife and control/limit undesirable species, 6) restocking pond after rotenone treatment with bass and crappie to provide recreational fishery and competition for carp fry entering the pond through irrigation water.



BYRON POND – SUNNYSIDE WILDLIFE AREA

PRE-REHABILITATION PLAN
Byron Ponds Management Unit
Sunnyside Wildlife Area

I. PROPOSAL

A. Justification for Proposed Rehabilitation

Ponds within the proposed treatment area (TA) were treated with rotenone in 1986 to remove undesirable fish species including carp and provide a better aquatic environment for waterfowl production. Breeding duck use increased dramatically post-treatment. Numbers of duck broods peaked at very high levels in the late 1980s and declined annually to pre-treatment (very low) numbers by the late 1990s. Carp were observed in most ponds in the TA by the late-1980s. The dominance of carp is the likely cause of the dramatic decline in observed duck use.

B. Physical Description of Water Proposed for Rehabilitation

1. WATER: Byron Pond, an irregular-shaped, connected pond system, fed by springs and underground irrigation drains.
2. LOCATION: Sections 9,10,11,12, T8N, R23E; Yakima County
3. SURFACE ACRES: 83.72 MAXIMUM DEPTH: 4 feet
4. VOLUME: 47,935,940 gal H2O (147.11 acre-feet)
5. OUTLET: Water leaves the wildlife area, travels through two private ownerships before falling over a basalt cliff into the Yakima River.
6. STREAM: Unnamed drainage ditch, about 3 miles in length. FLOW: 0.5 to 0.8 cfs, based on 3 readings in May/June 2007. Flow can reach 1.0 cfs in winter.
7. PUBLIC ACCESS: 98% of the TA is public land. Of that, about 50% is open for public recreation. The other 50% is the Byron Reserve where public access is allowed, but restricted to certain activities.
8. LAND OWNERSHIP: PUBLIC 98% PRIVATE 2 % Parts of both the incoming and outgoing canals are on private lands.
9. ESTABLISHED RESORTS: None

C. Proposed Management Actions

1. WATER: A single, continuous pond, the incoming canal and outgoing canal, all the way to the water control structure where **outflow will be stopped** during treatment.
2. TARGET SPECIES: carp
3. DATE LAST REHABED: 1986
4. PROPOSED TREATMENT DATE: February-March 2008
5. REPLANTING DATE: to be determined
6. SPECIES: possible restock with bass and bluegill
7. CATCHABLES: N/A ; FINGERLINGS: N/A
8. PROPOSED TOXICANT: Rotenone, liquid CONCENTRATION: 4 ppm
   AMOUNT (ROTENONE AT 5% ACT. INGRED): 196 gal.
9. METHOD OF APPLICATION: helicopter and ground spray
10. CREW DESCRIPTION: Leader(s) Rocky Ross; Personnel ~ 6

II. PURPOSE:

Rehabilitation of the TA serves the purposes of fisheries and waterfowl. Removal of carp will increase invertebrate production and enhance food availability for desired ducks, fish species, and other species of aquatic wildlife.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

Waterfowl surveys will be conducted in July (duck brood count), August (molting ducks), and Oct.-Jan. (monthly aerial surveys for migrant/wintering waterfowl). Random creel surveys and biological sampling, as well as public comment, will be the measure of success for fisheries, if established. The complete elimination of carp from a system of this type is a challenge, but a planned drawdown, plus burning of emergent vegetation should expose all water surfaces for a complete treatment. Without a complete kill, 5 - 6 years of benefit would still be realized before rehabilitation is again necessary.

IV. RESOURCE IMPACTS:

1. The intent is that populations of the target species, (carp) will be severely and negatively impacted.

According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of populations averages 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larvae) are at risk, and turtles are affected somewhat less so.

2. District and Regional Fisheries, Habitat, and Wildlife biologists support the proposed rehabilitation plan.

3. The fishery has already been lost, but could be re-established again soon after treatment. Creating a successful fishery risks increased human use of the area and the associated impacts to habitat and wildlife. Public access can be structured to minimize disturbance to waterfowl while nesting/rearing. These waters are not a source of potable water for humans or livestock. The area will be closed to angling, and other recreational uses such as wildlife viewing during the planned period of treatment. Landowners will be notified, and letters of concurrence will be obtained from all water rights holders .

4. Professional biologists and other naturalists have visited this site frequently over the past 40 years. The WDFW Habitat and Wildlife Programs and PHS maps have been consulted. The TA is used heavily by waterfowl when carp populations are low or absent. The proposed treatment would increase use by desirable wildlife species. No wildlife uses will be impacted in a negative way by the proposed rotenone treatment.

V. MITIGATING FOR ADVERSE IMPACTS:

1. Human disturbance resulting from the improved fishery will be managed by limiting access during critical nesting/brood rearing seasons. This is already a walk-in site. Rehabilitation will be completed before the nesting season begins. The diverse habitat in the TA is home to much and varied wildlife, all of which would benefit from the increased aquatic food production after carp removal No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake.

2. No "downstream" resources will be impacted. Water within the TA will be first drawn down to minimum levels, then the flow will be stopped by a planned, improved water control structure on the east end of the project. Water will be retained in the TA until all traces of rotenone are gone.

3. No endemic, rare, threatened or otherwise listed species known to inhabit this area will be adversely affected by the proposed treatment.

4. Protective wear for the eyes, face and hands will be required for all purveyors of rotenone.

5. Ponds will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish.

VI. RECREATIONAL IMPACT:

The increased number of ducks produced in the waters to be treated will be available to hunters.

Almost no fishery currently exists, so angling opportunity could be greatly enhanced. Hard data are not available to accurately judge CPUE on these waters because a shortage of manpower prohibits surveying all the area year around lakes and ponds on a regular basis. Angling pressure in the TA is has been "low key" and consistent in the past, rather than intense and concentrated temporarily as on opening day waters. Recreational opportunity will be increased.

VII. ECONOMIC IMPACTS:

The number of waterfowl hunting trips would be expected to increase, but an estimate of the magnitude of the increase would be difficult to predict. Given the discussion in part VI, and due to the as yet undetermined nature of the fishery, the expected economic value is also difficult to estimate. However, as recreational opportunity increases, economic values in the local area increase. Even a minimal fishery could be expected to generate several hundred additional angling trips, resulting in an increased economic impact totaling $7-8,000 per year to the state's economy (1991 dollars; based on WDFW's

estimate of $37.90 per trip). Rehabilitation would bring back the fishery and associated economic activity.

VIII. RELATED MANAGEMENT ACTION:

Assessment surveys for waterfowl production and other wildlife would follow treatment, and will be compared with historical data. If a fishery is deemed desirable and a good fit with waterfowl objectives, broodstock to re-populate these waters would likely be captured from other systems.

IX. PUBLIC CONTACT:

Public meetings were held during July 2007 in Ephrata, Spokane, Prosser, and Olympia to explain DFW's 2007-08 rehabilitation proposals, assess public opinion, and address local concerns. An announcement will be provided statewide and to area papers and radio stations and hand delivered or mailed to landowners and residents near the lakes. The project will also be discussed with the District 4 Team and the Citizen Advisory Group for the Sunnyside Wildlife Area

The public meeting in Ephrata was held at 7 p.m. on July 11 at the WDFW Northcentral Region Office. Four people attended, including a representative of the WA Dept of Ecology. Most questions concerned the rehabilitation program in general. The public participants were primarily interested in the Chopaka and Sprague lake treatments, and all were in favor. No questions concerning the Byron Ponds arose.

The public meeting in Spokane was held at 6 p.m. on July 12 at the WDFW Eastern Region Office. Twenty-five people attended, most to discuss the Sprague Lake proposal, and the overall meeting tone was positive. The general opinion was that the project was a good idea and that the re-started fishery was anticipated to be a good thing for anglers in the Spokane area. No questions concerning the Byron Ponds arose.

The public meeting in Prosser was held at 7 p.m. July 12 at the Benton Rural Electric Association building. Two people attended. The public participants were primarily interested in the Byron and Sprague lake treatments, and all were in favor.

The public meeting in Olympia was held at 7 pm on July 10, 2007 at the Dept of Natural Resources Building. No one from the public attended.

Comments on the SEPA for rehabilitations statewide will also be accepted during the month of August. The SEPA can be found on WDFW or WA Dept of Ecology's web sites, or at County offices (usually Planning Commission). Additional comments may be sent directly to WDFW via mail or e-mail.

Initiated by: Region Three, Wildlife Program and Lands Division

PUBLIC MEETING SUMMARY
2007 LAKE AND STREAM REHABILITATION PROGRAM

Public Outreach: Public meetings were held during July 2007 in Ephrata, Spokane, Prosser, and Olympia to explain WDFW's 2007-08 rehabilitation proposals, assess public opinion, and address local concerns. A June 27, 2007 news release announcing these meetings was issued statewide and to area papers and radio stations. Notices of the public meetings were mailed to landowners and residents near the lakes.

State Environmental Protection Act (SEPA): Public notification also occurred through the SEPA process. SEPA was initiated July 27, 2007 and completed August 28, 2007. Notices were mailed to a large list of concerned parties, were posted at the WDFW Region 1, 2 and 3 offices, and information was available on the WDFW SEPA web page. One response was received by WDFW through the SEPA public comment process questioning the lake management plan, the stocking of other game fish species, and questioning the need for rehabilitation. Response to this comment occurred August 30, 2007.

Sprague Lake Meetings: WDFW formed a formal stakeholders group, the Sprague lake Workgroup, to discuss fishery management options for Sprague Lake. This group was comprised of local landowners, local constituents, resort owners, County Commissioners, representatives of sport angling clubs and environmental groups. The work group met twice in the past two years. The first meeting occurred May 13th, 2006. The meeting was held to review with the stakeholders all of the possible management options that could be undertaken to improve the fishery at Sprague lake. Additionally, WDFW committed to conducting a creel survey to determine angler use and compare it to historical angler use.

The second meeting convened on March 10th, 2007, WDFW presented the findings of the creel survey and informed the stakeholders that angler use was reduced significantly from the late 1980s and early 1990s. It was discussed and decided amongst the stakeholders that steps in fish management should be taken to alter the existing fish population in Sprague Lake. At that time, WDFW recommended that the lake be treated with rotenone and the fishery re-started to provide for greater recreational value. It was agreed upon by the stakeholders group that this was a valid approach to improving the fishery. There was some minor opposition to this proposal but the majority of stakeholders agreed that the rotenone treatment approach would increase recreational activity and economic productivity.

On March 3, 2007, Chris Donley gave a presentation to the Inland Fish Policy Advisory Group (IFPAG) in Olympia Washington. The IFPAG was presented with the proposal to treat Sprague Lake with rotenone. There was general agreement that the proposal was beneficial. At the July 14, 2007 IFPAG meeting, WDFW staff provided updated information on fish population size and dynamics in Sprague Lake.

WDFW staff presented information on the Sprague Lake fishery and management recommendations to a meeting of the Washington Fish and Wildlife Commission on June 1, 2007. Members of the Sprague Lake stakeholders group, as well as Adams County and Lincoln County Commissioners attended this presentation. All agreed that the proposed treatment would provide significant recreational, environmental, and economic benefits.

Chris Donley, Jeff Korth and Steve Jackson worked with Madonna Luers to develop a media release discussing the project. The media release was distributed to most of the newspapers and other media within the area of influence of WDFW. Multiple radio and newspaper articles were done on the Sprague Lake project.

WDFW staff visited multiple walleye and bass clubs statewide to discuss the proposal to treat Sprague Lake with rotenone. A few individuals opposed the treatment, but no club to this date has expressed a formal dissenting opinion towards the project. Clubs visited included Walleyes Unlimited, W. Washington Walleye Club, Spokane Walleye Club, Columbia Basin Walleye Club, Potholes Bass Club, Spokane Bass Club, Inland Empire bass club and others.

Olympia Public Meeting: The public meeting in Olympia was held at 7 pm on July 10, 2007 at the Dept of Natural Resources Building. No one from the public attended.

Grant County Public Meeting: The public meeting in Ephrata was held at 7 p.m. on July 11 at the WDFW North Central Region Office. Four people attended, including a representative of the WA Dept of Ecology. Most questions were about the rehabilitation program in general. The public participants were primarily interested in the Chopaka and Sprague lake treatments. Proposals and procedures for the lake rehabilitations were discussed, and all were in favor of the proposed treatment of the lakes.

Spokane Public Meeting: The public meeting in Spokane was held at 6 p.m. on July 12 at the WDFW Eastern Region Office to review the proposed rehabilitation projects. Twenty-five people attended, most to discuss the Sprague Lake proposal, and the overall meeting tone was positive. The general opinion was that the projects were a good idea and that a re-started Sprague Lake fishery would be a good thing for anglers in the Spokane area.

One individual expressed his opposition to the Sprague Lake project, he felt that Sprague Lake was the only "small boat" walleye fishery in Washington. He and his daughters have enjoyed thousands of hours on the lake and they are upset to see the current fishery modified. He did concede that the fishery has been receiving very little use, and that our efforts are rational given the objectives that we stated.

Yakima County Public Meeting: The public meeting in Prosser was held at 7 p.m. July 12 at the Benton Rural Electric Association building. Two people attended. The participants were primarily interested in the Byron and Sprague lake treatments, and both were in favor.

Reply to Comments from Mr. Ben Lenz
SEPA No. 07-065ADD

Thank you for your comments and questions on the Sprague Lake management plan, and the proposal by the Washington Department of Fish and Wildlife to treat the lake and re-stock with appropriate species.

You raised several issues, and I will respond to them individually.

1. Species abundance related to angler effort. WDFW has conducted investigations on Sprague Lake that show a current abundance of larger, older walleye (about 60%), carp and tench (about 30%), and other species such as perch, bass, catfish and sunfish at less than 10%. The regional fish management biologists expect that, as the walleye population ages and declines in numbers over then next 5-to-10 years, the species that are poised to increase greatly in numbers will be the carp and tench. A fish population heavily weighted to these 2 species will result in significantly decreased water quality, loss of vegetation, and will be of no benefit to anglers, or to fish and wildlife habitat.

   Despite significant numbers of harvestable walleye in the lake, angler success has been very low. The reasons for this are not well understood. However, the angling effort for all species is less than half of what would be expected for this lake.

   Because the walleye densities in the lake are sufficiently high enough to preclude adequate recruitment of game fish to the creel, it is our observation that the productivity of the lake currently provides enough juvenile panfish to satisfy the current predatory demand by the walleye. The limited angling effort and harvest are the result of the reduced numbers of harvestable panfish and trout, owing to this predation.

   We expect that a balanced population of bass, crappie, catfish and other pan fish will provide a sustainable fishery, resulting in significantly increased angler participation. We also plan to stock trout for the first few years, to provide a trout fishery until the warm water species' populations have increased in abundance and a desirable species composition. This trout fishery will provide a great incentive for anglers in the interim.

2. Alternative measures to increasing angler effort. WDFW has considered several options for Sprague Lake. The well-advertised attempt to adjust bag limits and other regulations to increase harvest did not result in increased angler effort or harvest of walleye (or other game fish), and current harvest levels are inadequate to reduce walleye numbers so that panfish might respond. Options to increase stocking of trout and other fish species are not viable due to cost. Options to enhance fish habitat to increase fish production and reduce predation were not considered viable due to the physical characteristics of the lake. Mechanical removal of problem fish species was considered, but a search of the literature and experience of the fisheries managers resulted in this option not being chosen because it has not been shown to be effective.

   Your suggestions to improve boat ramps and establish campgrounds were considered, but were not put forth as options in the management plan because

they were neither necessary nor economically feasible, due to ample public access. Currently, there are 2 private resorts on the lake, which attract few anglers due to the poor fishing. The WDFW has recently constructed a new boat ramp, excellent parking, and toilet facilities on Sprague Lake.

3. Three-year absence of fishing on lake following treatment. This is an erroneous assumption. The management plan specifically describes the fish stocking objectives for the lake. The year following treatment (2008), WDFW plans to stock 100,000 catchable rainbow trout, as well as 3,300 bass and sunfish species. Over 250,000 juvenile fish will be planted that first year to contribute to fisheries beginning in 2009. With the balance restored to game fish populations and reduction of the carp and tench, WDFW expects outstanding fisheries in the first several years following treatment.

4. The 1985 treatment and resulting fisheries. The 1985 treatment was followed by stocking of game fish species in the year following rehabilitation (1986). The stocking program resulted in one of the best trout and warm water fisheries in the State for 15 years. Data from 1988-1992 were used in the management plan because data on angling effort and harvest were not available until that year. The 1988-1992 creel study was undertaken to investigate and document the effectiveness of the lake management. The warmwater fishery on Sprague Lake was popular through the 1990s, not just through 1992, as you state. It was the increase in the proportion of walleye in the late 1990s that resulted in limiting the recruitment of other game fish in the lake and the concurrent reduction in angling effort and harvest. By this time, the increase in carp and tench led to degraded water quality and impaired fish and wildlife habitat. With the reduction of carp and tench, and the establishment of a sustainable panfish population in the lake (without walleye as the top predator), it is reasonable to expect outstanding fishing opportunities for another 20-year period.

5. Stocking of white sturgeon. The 25 sturgeon that may be planted in the lake is a very minor component of our re-stocking considerations, but would provide an opportunity for anglers to catch a larger fish. These would not be the ESA-endangered Kootenai white sturgeon. Neither would these few fish be 'mined' from areas with low populations in the middle or upper Columbia River, or the Snake. If it is decided to stock sturgeon into Sprague Lake, they would be surplus juvenile stock from the Upper Columbia sturgeon restoration project produced at the WDFW Priest Rapids hatchery facility complex, and released at about 3-to-5 to the pound. As there is no spawning habitat for this species in the Sprague Lake watershed, we would not expect any recruitment from these fish.

   There is no indication that white sturgeon were historically present in Sprague Lake. The current fish species distribution of panfish, trout, carp and tench were likewise not present historically. The Department of Fish and Wildlife manages a number of lakes that historically had no game fish, or no fish at all, for the benefit of the anglers and the citizens of the State. You questioned why we would stock a long-lived fish into a lake that may be treated again in the foreseeable future. This is simply to provide an opportunity for the angler to catch a larger fish, when these fish grow to a larger size.

6. Stocking of Tiger musky. The potential of using a sterile predator to keep the several fish populations in balance is an option that is still being analyzed by the

department. It is recognized that some stocked hatchery fish may be predated by this hybrid, but it is hoped that the benefits of having tiger muskies in the lake will provide a level of predation on panfish, which will avoid these species getting out of balance. It is also hoped that they will prey on undesirable species that are illegally re-introduced into the lake, as well as provide another larger fish for the angler. The benefit of using tiger muskies as a top predator in the lake is that they will not reproduce, leading to a highly unbalanced species distribution as we are currently observing with the walleye in the lake.

7. Harvest of fish prior to treatment. It is the practice of WDFW to remove daily bag and size limits on lakes that are scheduled for rehabilitation. This usually occurs immediately following the approval of the project by the Director of the Department of Fish and Wildlife.

Beyond the angling issues that you have raised, the WDFW is seriously concerned about the degradation of water quality and aquatic vegetation necessary for producing food and habitat for a wide variety of fish and wildlife species. The colony of western grebes is one of four remaining colonies for that species in Washington State, and one of the few remaining nesting sites for the common loon. When the carp and tench population again increases, we expect that the loss of emergent aquatic vegetation will adversely impact these nesting species. Similarly, the loss of submerged aquatic vegetation will adversely impact the food supply for migrant and wintering waterfowl.

I hope I have addressed your questions and comments. If you have any further questions, please feel free to contact me at (360) 902-2711 or email me at anderjda@dfw.wa.gov

Sincerely,
Jon. Anderson
WDFW Fish Program
Native Freshwater Species Program Coordinator
600 Capitol Way N
Olympia, WA 98501-1091

Comments to Sprague Lake rehabilitation management plan proposal

To Whom It May Concern at WDFW:

In general, I don't understand the logical connectivity to how restarting the fish community and each species' relative abundance to one another will lead to increased angler effort in Sprague Lake. It appears that increasing the effort by other means such as increasing angler ability to fish in Sprague Lake may be better use of the proposed funds. Boat ramp improvements, associated campgrounds for overnight and longer-term fishing, and increased media exposure are some alternative activities that were not considered in this proposal and may improve the angling effort without causing the initial 3-year absence of any fishing for any species in this lake. Additionally, if the current walleye population is at an appreciable harvest level, why aren't the anglers present to reap the benefits now? I feel that the public response that Washington Dept. of Fish and Wildlife seeks on improving angler effort is already offered; interest is limited, now and in the future. The fact that this management activity was already attempted beginning in 1985 and led only to a brief rebound in angling effort in 1988-1992 doesn't allow me to

understand how duplicating this effort will have better results a second or third time. The long-term management implications of this plan are flawed and only appear to provide short-term benefits.

While perusing the details of the plan, I stumbled and was completely surprised to see that the restocking plan includes white sturgeon, an endangered species in the Kootenai River, and a species of concern in the Columbia and Snake River basins. Putting the political situation aside, I don't understand the biological relevance of stocking white sturgeon in this water body. I haven't found any information that states that the white sturgeon ever occupied the Sprague Lake watershed. Does other information exist that says otherwise? If so, removing these individuals is in contrast to their sensitive population status in the region. Does WDFW intend for the white sturgeon to become a self-sustaining population in this watershed? If this is the case, the age when white sturgeon females sexually mature ranges from 16 to 35 years. The current proposed plan is for a 20-yr. period of time to pass before this watershed would be reconsidered again for the same rotenone fish removal treatment. This would undoubtedly remove these planted fish that were allowed no chance to reproduce and, even if they did, it would serve no purpose as their progeny would be removed. So, why is WDFW even considering releasing long-lived fishes into a water body where they only have short term (< 20 years) goals? Additionally, white sturgeon added to this watershed will probably feed on the restocked individuals because it may be the only food source available to them. They most likely will feed at a rapid rate given the warm waters available to them in this water body. They may eat themselves "out of house and home", so-to-speak, leaving few, if any, individuals for angler harvest. So, if the numerous tiger muskies don't consume all of the restocked forage fish, the sturgeon may accomplish this. I think the stocking of white sturgeon in this watershed needs further study as to its ecological impact. Furthermore, this example points out a further lack of logic guiding this proposed management plan.

Finally, if this proposal is acceptable and does occur, will the public be allowed to harvest the existing fish without limit prior to their removal? I do believe there are other methods to accomplish your primary goal of increasing angler effort in Sprague Lake, and I'm not opposed to increasing the interest of recreational fishing for sport. However, I don't believe that WDFW has fully evaluated all the possible alternatives to increase this effort besides physical intervention in this water body. I think the biological reasoning guiding this plan is flawed and presents serious political and societal implications for how WDFW approaches managing non-native warm water fisheries, including species of concern.

Sincerely,

Ben Lenz
Fisheries Scientist
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(509) 398 1122
"Benjamin Lenz" < Blenz1@gcpud.org >

NEWS RELEASE

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
600 Capitol Way North, Olympia, Washington 98501-1091
Internet Address: http://wdfw.wa.gov

June 27, 2007

Contacts: Jon Anderson, 360-902-2711
Chris Donley, 509-892-1001 Ext. 307
Jeff Korth, 509-754-4624, Ext. 39

Proposals to improve eastern Washington fishing, habitat to be focus of public meetings July 10-12

OLYMPIA – The Washington Department of Fish and Wildlife (WDFW) will conduct a series of public meetings July 10-12 on plans to improve public fishing and waterfowl habitat by treating more than a dozen lakes and streams in eastern Washington with rotenone.

Rotenone is a naturally occurring substance derived from the roots of tropical plants that has been used by WDFW and other fish and wildlife agencies nationwide to rehabilitate lakes and streams for more than 50 years.

"The treatments we are proposing for this fall are designed to reduce numbers of undesirable fish such as carp and tench that compete with game fish and destroy aquatic vegetation," said Jon Anderson, a WDFW fish biologist. "Rotenone has been tested extensively and found to present no significant health risk to people, pets, livestock or non-targeted wildlife."

Public meetings on treatment plans for this fall are scheduled at the following places and times:

- **Olympia,** Tuesday, July 10, 7 p.m. at the Natural Resources Building, 1111 Washington St S.E., in Room 172
- **Ephrata,** Wednesday, July 11, 7 p.m. at the WDFW Northcentral Region Office, 1550 Alder St. N.W.
- **Spokane Valley**, Thursday, July 12, 6 p.m. at the WDFW Eastern Region Office, 2315 N. Discovery Place
- **Prosser**, Thursday, July 12, 7 p.m. at the Benton Rural Electric Association building, 402 7th St., in the conference room near the east entrance.

The waters proposed for treatment, along with the fish species targeted for removal, are:

- Sprague Lake and associated waters in Adams and Lincoln counties, including Hallin, Cow and Finnell lakes, Sheep Springs, Negro, Damage, Cow, and Lugenbeal creeks, and Dixon's pond for carp, tench, and walleye.

- Corral, Blythe, Chukar, and Scaup lakes on the Columbia National Wildlife Refuge (Grant County) for pumpkinseed sunfish and crappie.

- Chopaka Lake (Okanogan County) for smallmouth bass.

- Blue Lake (Okanogan County) for bullhead catfish.

- Byron Ponds on the Byron unit of WDFW's Sunnyside Wildlife Area near Prosser (Yakima County) for carp to allow restoration of waterfowl habitat and warmwater fisheries.

Application of rotenone is regulated by the Environmental Protection Agency, and locally through the Washington Departments of Ecology and Agriculture, Anderson said.

Under WDFW's plan, fishing lakes will be re-stocked the following spring with the preferred species of fish after treatment in fall, he said. More specific information about the proposed Sprague Lake rehabilitation can be found at http://wdfw.wa.gov/factshts/sprague_lake_rehab_may07.htm.

In addition to input received at the public meetings, WDFW will also accept written comments received by Aug. 15. Written comments should be addressed to Jon Anderson, Washington Department of Fish and Wildlife, 600 Capitol Way N., Olympia, WA 98501-1091.

WDFW will also initiate a separate comment period in August through the department's State Environmental Protection Act (SEPA) process. The deadline for that comment period will be announced when the SEPA process is initiated in mid-July.

Final approval consideration of the proposals by the WDFW director is scheduled for late August.

John Casson
24199 398th Street
Laporte, MN 56461
July 25, 2007

Jon Anderson
Washington Department of Fish and Wildlife
600 Capitol Way, N
Olympia, WA 98501-1091

Mr. Anderson,

Please accept these comments concerning lake reclamation proposals in eastern Washington using rotenone. My comments are specifically concerning Chopaka Lake, Okanogan County.

I have been fishing Chopaka Lake for the past 30 years. In that time, I have seen significant changes in the lake, the fishery, and in the management of the lake. For example, Atlantic salmon were still thought to be residents of the lake and outboard motors were still in use when I first began fishing there.

During the late 1980's when smallmouth bass were first rumored to have been introduced into Chopaka, WDFW had plans to rotenone the lake immediately. At that time, I spoke with the lakes manager in Olympia (my memory isn't good enough to remember a name) and voiced my opposition to reclaiming the lake. My opinion was reclamation should not occur until there was a real problem. For whatever reasons, Chopaka was not reclaimed and with some management modifications, we got an additional 20 years out of the fishery. However, Chopaka Lake now has real, serious problems and I am in complete support of the rotenoning and reclamation of the lake. It is clear that trout recruitment is near zero and smallmouth bass populations are increasing exponentially. The few large trout remaining in the lake will be dead in two years if not sooner. For all practical purposes, Chopaka is now dead as a trout fishery.

Hopefully, WDFW will take advantage of this reclamation effort to regain the quality trout fishery that Chopaka once had. Although the average size of the fish has increased in recent years, the quality of the trout in Chopaka has decreased over the past 10-15 years. Quality is more than size. Chopaka was once known, and got its reputation for trout that would jump 3-5 feet in the air and strip you down to your backing. These qualities have been gone for a long time. Washington State has gone triploid crazy! These fish are large and lethargic. They do not constitute quality. Chopaka is no place for triploids. Let the triploid folks take their marshmallows to Rufus Woods. Whatever has changed, WDFW needs to get Chopaka Lake back to the quality trout fishery it once was during the early 1980's and earlier.

Another issue that needs attention at Chopaka Lake is cattle grazing. About 10 years ago, a group of us worked to have the BLM change their grazing impacts on the north half of

the lake. While this was mostly successful, cattle impacts on the south half of the lake, particularly the DNR administered State lands, are atrocious. Cattle grazing along and in Chopaka Lake continues to degrade the quality of the fishery, the water, the fishing experience and fish and wildlife habitat. Chopaka is a closed basin and nutrient flushing does not occur. Emergent vegetation and residual stems are important for nesting birds, brood rearing and fish cover, and is a critical component in the life cycles of most of the macro invertebrates in the lake.

Washington State has regulations prohibiting even private landowners from cutting a tree along a waterway without a permit. It is incredible that Washington State would allow the perpetual and persistent impacts of cattle grazing, on State administered public lands, in and along one of the State's premier trophy trout waters.

Chopaka is presently being used as a cow wallow and sewage lagoon. Lake reclamation provides a good opportunity for WDFW to look at improved management of the entire lake system, to improve and protect the fishery and your management investment. I urge you to take advantage of this opportunity. We will be contacting Washington DNR and letting them know what we think of their management, or lack thereof.

John Casson
24199 398th Street
Laporte, MN 56461
218-224-2985
jcasson@paulbunyan.net

Ron Sikes
1709 Gise St.
Port Townsend, WA 98368

28 June, 2007

Jon Anderson
Washington Dept. of Fish & Wildlife
600 Capitol Way N.
Olympia, WA 98501-1091

Mr. Anderson:

Concerning the proposal to improve eastern Washington fishing and waterfowl habitat, I am writing to state my full support for treating the list of lakes and streams with rotenone. The introduction of exotic fish species including warm water species too often leads to stunted fish and depletion of the invertebrate food base. Also these species often require specialized gear including a boat and provide only a narrow season for successful fishing. My experiences are those suitable Washington lakes and streams managed for trout provide more opportunities to catch fish whether one is fishing from the bank or a boat and for all age classes of fishermen/women. I also realize some lakes will be treated to enhance fishing for warm water species.

I would support expansion of treating additional waters to enhance trout fishing and smolt survival of salmon/steelhead.

Sincerely,

Ron Sikes

From: Jon Anderson
To: Program Fish Management
Date: 06/08/2007 10:15:10 AM
Subject: E211852 Re: Chopaka Lake

Dear Mr. English,

The local WDFW District Fish biologist for Okanogan County has been working for a number of years with the fly-fishing clubs to maintain Chopaka Lake as a premier fly-fishing water. We responded to recent significant declines in the catch of trout in the lake with a series of gillnet surveys to determine the productivity, species and population structure of the lake.

The results, in a nutshell, are that there are still quite a few large rainbow trout in the lake. There is also an increasing number of illegally-introduced smallmouth bass that have established themselves. However, there is practically No recruitment from recent trout fry plants; competition and predation from both the large rainbows, as well as the bass, is precluding the establishment of the proper age distribution of the trout.

I personally assisted with a survey in October of last year. 2 short gillnets caught 30 large rainbows (both diploid and triploid) released as fry 3-to-5 years ago or longer. Only one trout from the previous year's fry plant was caught - a skinny 14-incher. No fry from that summer's plant were detected. This is an upside-down pyramid, and indicates that the population demographics are wildly out of balance, resulting in poor catches by the angler.

The District biologist has been in regular communication with the fishing community at the lake, and offered several options. These included:

a) Do nothing - continue stocking fry that likely will not survive; large trout will eventually die off; bass will increase

b) Plant "catchable-sized" trout to get around the issue of fry predation - a costly solution that would take away from other regional lakes needing "catchable" plants, as there are only so many large trout available at hatcheries

c) Plant predatory trout, such as browns or tiger trout - fry survival would still be an issue; WDFW hatcheries don't have capacity to grow out sufficient "catchable" browns/tigers; bass populations respond only somewhat to predators

d) Mechanical removal - gillnetting is ineffective at removing bass from a lake the size of Chopaka, given the resources available to the agency (time, staff, equipment)

e) Liberalize gear and retention regulations to allow more harvest of trout - not acceptable to fly-fishing community; ineffective control of bass via regulation changes

f) Rehabilitation with rotenone - generally effective; thorough treatment would allow restoration of fishery within +/-2 years; catchables would likely be stocked the first year after treatment, and fry plants should resume that same summer/fall.

The District biologist will update the Chopaka Lake Management Plan, and prepare a Pre-Rehabilitation Plan for inclusion in our annual lake rehabilitation proposals this summer. We expect to provide this information through the State Environmental Protection Act (SEPA) process for public

review and comment, as well as at several public meetings this July. We can keep you on the list for notification if you so desire. Final decision will be made by the WDFW Director in September.

Please feel free to contact me with any further questions.

****
Jon. Anderson
Washington Dept of Fish and Wildlife
Fish Program
Resident Native Species Fisheries Mgr
600 Capitol Way North
Olympia, WA 98501-1091
Ph: 360-902-2711
Fx: 360-902-2944
anderjda@dfw.wa.gov
****

>>> Program Fish Management 06/07/2007 4:19 PM >>>
Please prepare a DRAFT response and reply to FishPgm@dfw.wa.gov "Program Fish Management" ***PLEASE NOTE THE LOG NUMBER IN THE SUBJECT LINE* If you cannot have this returned to me within 5 working days, please reply immediately indicating the appropriate staff for reassignment of this correspondence. Thank you. ~Colleen Desselle (360) 902-2653~**

>>> Tom English < tenglish@plymouthhousing.org > 06/04/07 8:48 AM >>>
I've heard rumors that Chopaka Lake is going to be treated with rotenone this fall to get rid of the bass that were illegally introduced. Can you tell me if this is true, and how long it's estimated that the lake will take to return to its former glory.

And can you tell me what happened to the lake over the past couple years, why the large trout have disappeared?

Thanks..

Tom English

Facilities Director

Plymouth Housing Group

2209 First Avenue

Seattle, Washington 98121

PRELIMINARY LIST OF 2008-2009
PROPOSED WATERS FOR TREATMENT

Attachment 1: Waters Proposed by WDFW for Treatment With Rotenone

2008 29 April 2008: Preliminary Proposed Waters

Name Location		Grid Location			Size		Rotenone required @ 5%		Treatment History	Proposed Treatment		
County	Water	Section	Township	Range	Acres	Acre Ft.	Powder (lbs.)	Liquid (gal.)	Years Previously Treated	Target Species	Treatment Dates	Outflow at Treatment
Okanogan	**Starzman Lakes**	35,36	32N	24E	18	252	680	10	50,72,81	PS	Fall 2008	None at time of treatment
	Fanchers Dam	2	38N	28E	20	500	1,350	10	Never Treated	LMB	Fall 2008	None at time of treatment
	Big Buck	2,35	33N	21E	20	200	540	10	Never Treated	LMB	Fall 2008 +	None at time of treatment
Stevens	**Hatch Lake**	30,31	35N	40E	34	540	1,458	5	63,71,78,88,95,99	YP,LMB	Fall 2008	None at time of treatment
	Little Hatch Lake	30	35N	40E	14	74	401	5	64,71,78,88	YP,LMB	Fall 2008	None at time of treatment
	Keogh Lake	19	35N	40E	18	668	1,804	5	78,88	YP	Fall 2008	None at time of treatment
	Williams Lake	36	38N	38E	38	980	2,646	10	96,02	YP	Fall 2008	None at time of treatment
Pend Orielle	**Frater Lake**	34	37N	42E	15	90	486	5	52,60,68	PS	Fall 2008	None at time of treatment
		3	36N	42E								Drains to Leo Lake
Ferry	**Ellen Lake**	26,27	35N	36E	78	902	2,435	5	89,94,04	LMB,GS	Fall 2008	None
Spokane	**West Medical**	11,12,13,24	24N	40E	235	4,900	32,200	30	57,63,71,93,00	BBH	Fall 2008 +	None at time of treatment
	Fish Lake	4, 5	23N	42E	47	2,122	8,000	40	56,63,68,75,98	BBH, GF, YP	Fall 2008	None
		32	24N	42E								
Lincoln - Adams	**Fourth of July Lake**	1,2	20N	38E	112	2,016	20,966	20	1958	fathead minnow	Spring 2009 +	None at time of treatment
Franklin	**Worth Lake**	20	13N	30E	12	85	600	5	69,79	CP,YP	Fall 2008	None - Water Control Structure
	Powerline Lake	4,5	13N	30E	50	1,050	2,500	10	1968	YP	Fall 2008+	None at time of treatment
Grant - No. 1	**Heart Lake**	28	17N	29E	26	889	4,800	10	59,87,97	PS,YP	Fall 2008	Canal Lake
"Canal Chain"	**June Lake**	21, 22	17N	29E	11	163	840	10	90,97	PS,YP	Fall 2008	NN Windmill Lake
	North North Windmill Lake	22	17N	29E	4	46	250	10	90,97	PS,YP	Fall 2008	North Windmill Lake
	North Windmill Lake	27	17N	29E	20	356	1,850	20	75,90,97	PS,YP	Fall 2008	Windmill Lake
	Windmill Lake	27, 28	17N	29E	37	1,120	5,800	10	68,75,82,87,90,97	PS,YP	Fall 2008	Canal Lake
	Canal Lake	2, 28, 33	17N	29E	92	2,043	10,600	20	59,68,75,82,87,90,97	PS,YP	Fall 2008	Pit Lake - can be blocked
Grant - No. 2	**Aztec Lake**	1	17N	26E	3	22	80	0	Never Treated	PS, LMB, YP	Fall 2008	None
"Desert Chain"	**Desert Lake**	31	18N	27E	42	195	560	20	71,73,79,84	PS, LMB, YP	Fall 2008	None
	North Desert Lake	31	18N	27E	3	25	80	5	Never Treated	PS, LMB, YP	Fall 2008	None
	Dune Lake	36	18N	26E	8	65	350	5	Never Treated	PS, LMB, YP	Fall 2008	None
	Sedge Lake	36	18N	26E	9	85	450	5	Never Treated	PS, LMB, YP	Fall 2008	None
	Tern Lake	36	18N	26E	8	65	350	5	Never Treated	PS, LMB, YP	Fall 2008	None
	Harris Lake	36	18N	26E	39	353	980	10	84,97	PS,LMB	Fall 2008	None at time of treatment
	Beda Lake	15,22	18N	26E	50	352	2,340	80	76,84,96,00	PS	Fall 2008	None
	Brookies Lake	22	18N	26E	20	201	1,525	70	73,76,84,96	PS	Fall 2008	None
	March Lake	23	18N	26E	9	50	185	5	76,89	LMB	Fall 2008	None at time of treatment
	Sanddock Lake	23	18N	26E	11	54	185	5	76,89	LMB	Fall 2008	None at time of treatment
	Buckwheat Lake	23	18N	26E	19	76	230	10	76,89	LMB	Fall 2008	None at time of treatment
Grant - No. 3	**Upper Caliche Lake**	22	18N	23E	21	250	2,220	30	79,83,88,92	YP,SMB	Fall 08 or 09	to Lower Caliche Lake
	Lower Caliche Lake	22,27	18N	23E	14	50	1,040	20	75,83,95	YP,SMB	Fall 08 or 09	to West Caliche Lake
	West Caliche Lake	27	18N	23E	4	9	325	32	1995	YP,SMB	Fall 08 or 09	outflow goes underground
	- Caliche Lk associated waters	27	18N	23E			65	110	1995	YP,SMB	Fall 08 or 09	to West Caliche Lake
Pend Orielle	**Cee-Cee-Ah Creek Native Trout Restoration**	1,11,12,14,15,21,22,28	34N	44E	TBD		0	TBD	Never Treated	Non-native trout	Fall 2008 3 Treatments	KMnO4 Neutralization at Falls
29 April 2008: Preliminary Proposed Waters					1,161	20,848	111,171	662				